

ANNALS
OF
OTOLOGY, RHINOLOGY
AND
LARYNGOLOGY.

VOL. XIX.

JUNE, 1910.

No. 2.

XVII.

FURTHER OBSERVATIONS ON SOME OF THE
NEWER THERAPEUTIC MEASURES IN EAR,
NOSE AND THROAT AFFECTIONS.*

BY JOSEPH C. BECK, M. D.,

CHICAGO.

At the present day, when enthusiasm is so great on account of the success of surgical intervention in our specialty, the nonsurgical measures fail to attract the average man unless positive results can be demonstrated by their employment. Unfortunately, there are but few specific remedies for specific diseases, such as, for instance, mercury, quinin and some of the antitoxins. Nevertheless, the diligent therapist who will conscientiously employ remedial agents which have been given to him by scientific men will find considerable satisfaction from their use.

*Read before the American Otological, Rhinological and Laryngological Society (Southern Section), Washington, February 12, 1910.

While it is true that the greater number of chronic affections in ear, nose and throat are only to be relieved by surgical intervention, there still remains room for local and medicinal treatment, as, for instance, where operation is contraindicated by some general condition or where operation is refused. Again, there are remedies to be used in after-treatment to operations, for it can be said without question that even operations do not always occasion the cure.

I have mentioned "chronic affections" because this paper deals with therapeutic measures principally employed in such rather than in acute diseases. It is not my purpose to go into great detail in any one subject, but simply to make a resume of my personal observations in the employment of these various remedial agents, hoping that the discussion will bring out some more points.

I have in previous papers made reports in extenso on several of these remedies; I now present my further observations, believing these to be of value, because every observer is more or less enthusiastic when trying something new, but later he becomes calmer and finds the true limitations of his experiments. I have divided this subject into six groups, as follows:

1. Therapeutic measures in chronic suppurative inflammations.
2. In chronic nonsuppurative inflammation.
3. In destruction of new cell formation or neoplasms.
4. In the production of new cell formation or epithelialization.
5. In the prevention of local and general infection.
6. In the influence of blood coagulation.

GROUP I. THERAPEUTIC MEASURES EMPLOYED IN CHRONIC SUPPURATIVE INFLAMMATION.

(a) *Bier's Treatment*.—After a thorough trial of this mode of treatment in chronic suppurative sinusitis, middle-ear suppuration and chronic follicular tonsillitis, I can positively state that many of my cases were influenced beneficially. Whether this improvement was due to the induced hyperemia and leucocytosis, or simply to the mechanical removal of the secretion, I am not prepared to say. I make use of the Bier's pump, to which there is attached a stiff-walled rubber tubing, and

to this the various ear, nose and tonsil attachments, as shown in Figure 1. The constriction band around the neck I have abandoned, as it is not so effective as the method employed.

(b) *Vaccine Therapy*.—After two years of faithful application in selected cases of chronic suppuration of the accessory sinuses, middle ear and chronic follicular tonsillitis, I am convinced that positive results or cures can be counted among

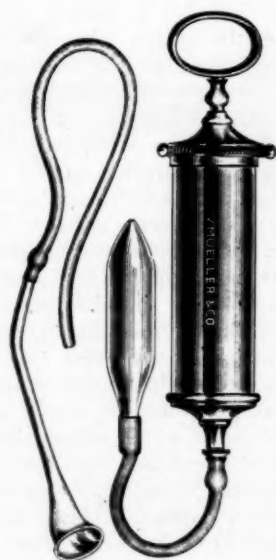


FIGURE 1.

the greatest rarities. I am equally convinced that the employment of vaccines in these conditions, associated with other treatments, is of marked benefit in quite a number of cases. It appears to aid in the healing process as a general tonic, and it is with that point in view that I am making use of the vaccine therapy.

Establishing first the most predominating microorganism present in each individual case by cultures and smears, I

obtain a vaccine of that variety, either by using one made directly from the culture, an autovaccine, or a stock vaccine which is generally of the polyvalent variety. Since the staphylococcus pyogenes aureus, albus, and citreus are the most frequent microorganisms found in these infections, I make use of the stock vaccine of these three types. I have discontinued the aid of the opsonic index and only go by the clinical manifestations, a rule that I have found practical, viz.: making injections about ten days to two weeks apart. It occurs sometimes that an injection is made at the wrong moment, known as the negative phase, when the patient will react locally and generally, so that his condition appears aggravated. This, however, lasts only a short time, when the beneficial results from the injection become manifest.

(c) *Bismuth Paste*.—The application of this remedy requires so much detail in carrying out the technic, filling the cavities of the nasal accessory sinuses and middle ear, that, unfortunately, it has not become popular. Thus far very few reports, except by myself, have been published as to its value or negative results in our special field; but in other fields of surgery there are so many splendid recoveries reported that I cannot help but make the following statement: I have been in personal communication with men who will say that they have treated sinus diseases by the aid of the paste with absolutely negative results, when, on closer questioning, I find that they have attempted to fill the cavities by the aid of a collapsible tube introduced into the anterior naris. Having never read the technic of its application into these cavities, they certainly cannot expect to obtain any results. Again, there are gentlemen, who know all about the technic, who expect results which are impossible and never have been claimed for this treatment. About a year ago I made my first report on my experiments with this remedy, and to-day I can make the following positive statements, after very careful observation:

1. In the routine treatment of filling the cavities of the accessory sinuses and middle ear I use the bismuth paste No. 1, which consists of bismuth subnitrate, 33 per cent, and vaselin, 67 per cent. It does not require heating.

2. The original instrument for injection has been discarded because it was not practical, not made well, and a new one

substituted. (Fig. 2.) This obviates the need of an assistant, is readily filled and the various tips and canulæ are easily attached.

3. The small calibre canula is first introduced into the frontal, sphenoid or antrum, as any other canula would be, and the syringe attached by means of the bayonet joint. When injecting the middle ear the olive tip is used. A small rubber tubing is passed through the small side opening to

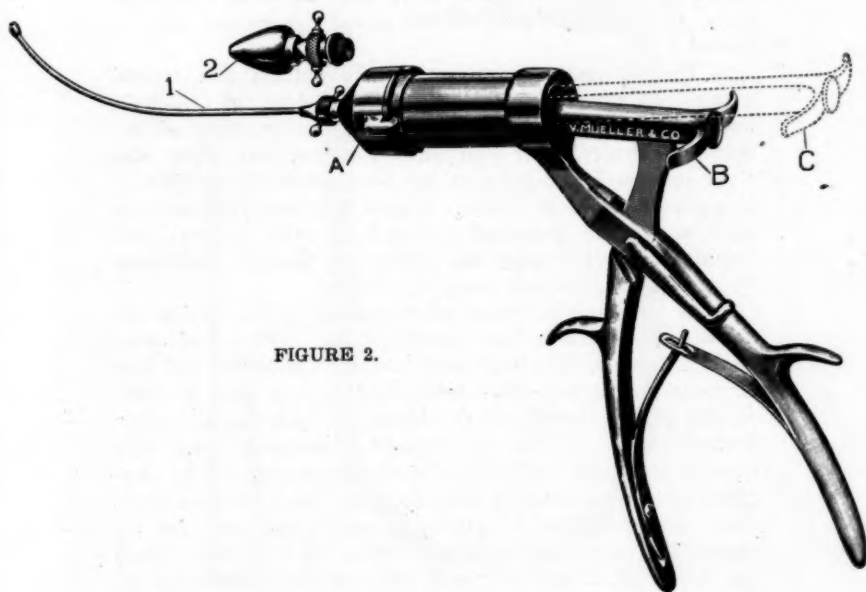


FIGURE 2.

permit the air to escape, and then the paste will return the same way, showing that every crevice as far as the aditus ad antrum has been filled. This I have proved in cases that I have operated on, as well as on a cadaver. The only exception is when there is a large eustachian tube. Then some of the paste will flow into the nasopharynx.

4. When treating a case of chronic sinus disease in which such pathologic changes as polypoid degeneration of the mucosa or eventually necrosis of the bony walls have taken

place, then the use of the paste, as well as any other non-surgical treatment, will have very little curative effect. I can say, however, without the least possible doubt, that while such sinus is filled with the paste there is less discharge and practically no odor.

5. Since the ethmoid cells are the most frequently involved or associated with suppuration of the other sinuses, and since these multicellular structures cannot be treated by the aid of the paste, it goes without saying that the middle turbinated body, as well as the ethmoid cell in most cases, are first removed.

6. The thorough curettment of the antrum and frontal sinuses by external operation (Caldwell-Luc or Coakley), and subsequently filling with paste No. 2, consisting of bismuth subnitrate 30 per cent, vaselin 60 per cent, white wax 5 per cent, paraffin 5 per cent, has been absolutely satisfactory in eight cases out of eleven. I have had the opportunity to open an antrum secondarily, that I had thus treated, and found after five months the cavity was entirely obliterated by a mass of connective tissue.

7. As a primary dressing, after removal of the middle and inferior turbinated bodies, cautery of the inferior turbinated body, cauterizing bleeding septal ulcer, I have never had better results from any other means of treatment than this one. It aids in the clotting of the blood and prevents adhesions from forming. It does not prevent drainage—in fact, aids it—and secretions will not so easily decompose. It is disagreeable to some patients when the paste drops into the pharynx; however, that is only for one treatment, and it cannot be classed as a valid objection. As a primary dressing I use No. 2 bismuth paste, and employ the olive tip attachment to the syringe. Patient closes postnasal space by the act of swallowing.

8. In atrophic rhinitis, dressing after submucous operation, I have discontinued its use, because it is not as good as other accepted methods.

9. Results from chronic suppuration of the ears have not been any more successful by this means of treatment than any other local measure, and the pathologic anatomy is sufficiently well known to explain the reason. At the same time this treatment is certainly as effective as any other palliative

measure, and, as for the odor, I have found that it is very well influenced in many cases by the paste. The objections to the possible blocking of the drainage is absolutely not valid; if anything, the drainage is promoted, and in several hundred injections I have never had the least symptom of retention or of bismuth poisoning by this mode of treatment.

10. It must not be forgotten that injection after a time

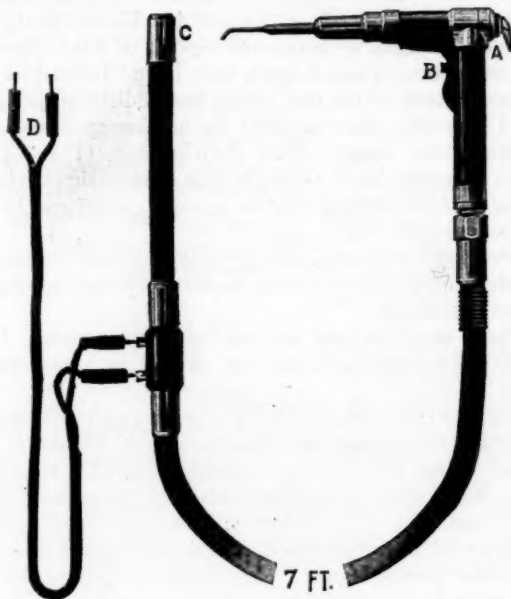


FIGURE 3.

must be suspended, the ear dried and packed with gauze, so that one may see if it is healed. As long as injections are made, there will always be some secretion.

11. In the mastoid operations I have discontinued its use as a primary dressing, but in subsequent dressings I use gauze impregnated with the paste as a packing with good results. Here, too, I stop after a time to substitute either dry gauze

pack or gauze impregnated with scarlet red powder or salve.

12. I have discontinued its use in chronic follicular inflamed tonsils, which I had injected a number of times, owing to the fact that patients were not cured of their repeated acute attacks; I recommend removal of the tonsils.

(d) *Superheated Air or Oxygen*.—About eight years ago I made a report on the use of superheated medicated air in a number of chronic suppurative conditions of the nose and ear, with demonstration of an instrument for that purpose. I had some good results from its use, but inadvertently dropped it, until I began to notice the reports of Prof. Bier, Lermoyez and others, when I again took it up. Instead of using air, I have a tank of oxygen, which has additional therapeutic value. I have also since modified the heating apparatus, using a miniature oven instead of an electric lamp. (Fig. 3.) The air and current pass through one tube, simplifying its handling, and the air and electric current cut-off can be made independently.

I have found this treatment of particular value in the cases where the secretions were thick, scanty and where considerable pain was associated.

I believe that the heat acts as the Bier treatment by hyperemia and leukocytosis, and the oxygen as a possible bactericide.

(e) *Vapor Therapy*.—This very much neglected but valuable therapeutic measure in chronic suppurative diseases of the nose and throat is, I believe, worthy of more attention. In cases of laryngotracheitis suppurativa this treatment is of a special value.

In cases of atrophic rhinitis, especially where the symptom of odor predominates, I have found the use of the vapor of distinct value to control the same.

I employ the Bullings thermo-regulating inhalation apparatus (Fig. 4), which permits of giving the patient different degrees of heated medicated vapor. Compound tincture of benzoin, normal salt solution or Ems water has been the vehicle I used. For the past three months I have experimented with a solution of radium, a radioactive water, but it has not had any better effect than the other remedies.

GROUP II. THERAPEUTIC MEASURES IN CHRONIC NONSUPPURATIVE INFLAMMATION.

(a) *Fibrolysin*.—In 1902 I reported on the use of thiosinamin in the adhesive inflammations of the middle ear, with the report that the tinnitus aurium appeared to be favorably influenced in some of the cases. I also called attention to the disagreeable symptoms, as well as the painfulness of the alcoholic injection. I was compelled to discontinue its use

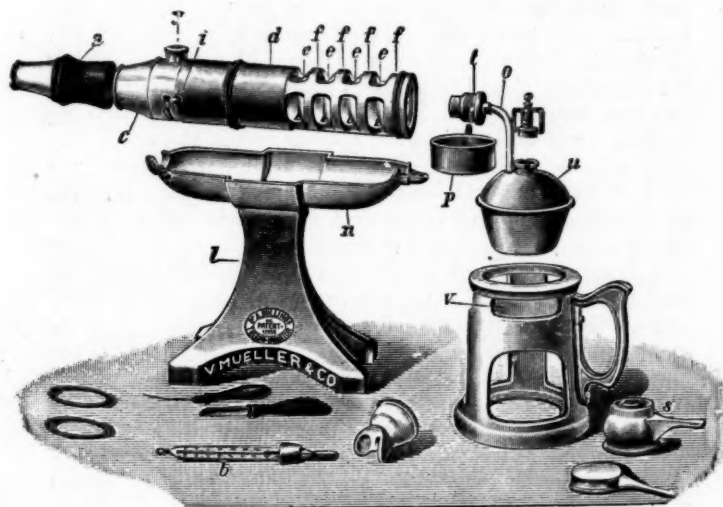


FIGURE 4.

in a great measure. About two years ago Mandl brought out the purer remedy—salicylate of thiosinamin—which he calls fibrolysin, for the same therapeutic purposes. I at once began to use it in my practice, and found it to have none of the disagreeable effects that the pure thiosinamin has. In order to determine the value of this remedy, I have tested each case carefully and controlled these tests from time to time, making exact records. All kinds of middle-ear inflammations of the

adhesive type were treated—that is, recent as well as old, those that had other treatment and those that did not. Also some cases of pure and clearly diagnosticated otosclerosis. It is needless to say that they were classified, but it is not necessary for me to make a detail report here. I have also watched with interest reports of this remedy in the nonsuppurative inflammation of the ear by other men (England and Austria), and find great difference between their results and my own in that they seem to be so successful, while my results were far from that. In 48 cases, 876 injections were given into the muscles of the arms. Usually one ampulla every other day. My procedure is as follows: Rx. fibrolysin (Merk's)—one original box (10 ampullæ). Sig.: for physicians' use. The patient's name is written on this box and kept for him only. When the 10 ampullæ are used up (within three weeks), another hearing test is made. A second box is employed in the same way, only at each injection a local treatment, as inflation, etc., is given in addition. At the end of the next three weeks, when the second box is used up, another hearing test is made for control. If no improvement follows at the end of this period, one may put that patient in the class of "doubtful improvement" and continue the treatment for another six weeks. If at the end of that period no improvement follows, then treatment may be discontinued. If it is found, after the one box is used up, that there is a marked improvement, that is, before inflation is employed as an adjunct, the case is in the "curative class," and one may expect definitely good results. The injections in these cases are continued until the patient is cured or until the hearing remains stationary. Unfortunately, this class of cases belongs to the greatest rarities. As to the symptoms of tinnitus aurium and dizziness and vertigo associated with deafness, I can positively state that these symptoms have been markedly influenced in quite a number of my cases. Summing up, I may say that, like so many panaceas for this chronic affection that have been advanced, this, too, falls far below its expectation. If, however, the pathology of adhesive inflammation of the middle ear and secondary labyrinth involvement is correctly interpreted, then this remedy, which is positive and specific in softening scar or connective tissue, is the proper agent to be employed. Of course, the products of the chronic inflammation are ex-

pected to be absorbed, and to this end an addition of iodine has been suggested. My own experience with a remedy, known as tiodin, is given below:

In the cases of pure otosclerosis, four in number, I have had absolutely no result on any of the symptoms after a very long-continued treatment.

(b) *Tiodin*.—This preparation is composed of thiosinamin, pure, and iodine, pure, in ampullæ, the same as the fibrolysin. The technic in the treatment is the same as when using fibrolysin. In nine cases in which I employed tiodin there was absolutely no effect from this treatment, whereas, when, after some months passed, I started with the fibrolysin, I had two cases react favorably, and four more improve considerably. The usual symptoms accompanying the use of thiosinamin or fibrolysin, as burning along the arm after injection, the tired and sleepy feeling, followed by the sense of well-being, were entirely wanting, and I must say that many a time I looked with suspicion on this fine French preparation.

(c) *Dionin*.—This preparation is better known to the ophthalmologist than to the otologist as to its action on the conjunctiva. There it produces an artificial edema lasting from five to thirty minutes. Arguing from analogy, I decided to employ it by injecting it through a Weber-Loebl catheter into the middle ear, and in two cases directly through the perforations into the cavity of the middle ear. I could never observe any such action in the ear as in the eye, nor were there any results from these experiments. I desire to mention this negative result simply because Randall, some time after I had made my experiments, but before I published them, described the action of this agent and his results.

GROUP III. THERAPEUTIC MEASURES IN THE DESTRUCTION OF CELL FORMATION AND NEOPLASMS.

(a) *X-rays, Radium and High Frequency Currents*.—The employment of these three remedial agents has in the last few years been very much advocated in our specialty in cases of local tubercular diseases and neoplasms, especially the malignant types. I have treated quite a number of cases of glands of the neck, supposedly tubercular, with very slow and not permanent disappearance of them, by the aid of the X-rays; malignant disease, as carcinoma of the auricle, ex-

ternal nose and lip, mouth, tonsil, tongue and larynx, without any effect. Some of these cases were treated also by means of radium of one million radioactivity without the slightest effect. The case of carcinoma of the middle ear, following recurrence after operation, I treated by the high frequency currents and by the method spoken of as fulguration. It was necessary to cocaineize the parts thoroughly before treatment, because the sparking required is very painful. This treatment appeared to be effective for a while, but the final outcome was fatal. Therefore I may state that, with the exception of lupus, which is very well influenced by the X-ray treatment, the other affections mentioned are either slightly or not at all benefited by the radioactive treatment in my hands. I may say that this treatment is carried out painstakingly by my radiologist under my care and observation. Furthermore, the one condition that is benefited by the X-ray treatment that I have mentioned, namely, lupus, is much better treated by what I shall next describe.

(c) *Carbon Dioxid (Snow)*.—This remedial agent, principally used by dermatologists for removal of moles, warts and other blemishes, has also been advocated in lupus vulgaris. I have treated one case that resisted all other means of treatment, including the X-ray, which is now practically well by the aid of snow. The technic is to prepare sticks of compressed snow from a tank of carbon dioxid, either in a chamois skin or a specially devised compression apparatus that I use. Pressing these pieces of snow over the affected area firmly for a few seconds (3 to 5) until this area is snow white constitutes one treatment. Different areas are thus treated at one seance. After one week the treatment is repeated, and so on until the condition is either better or worse, when the intervals for treatment will be lengthened. If the parts develop too great an erythema or reaction, one must wait until that disappears, although a certain amount is to be expected. I have also treated successfully by this means a mole of the pinna and a bleeding papillomatous polyp of the vestibule of the nose.

GROUP IV. THERAPEUTIC MEASURES TO INFLUENCE COAGULATION OF THE BLOOD.

Serum.—It was found that when pure serum or any of the antitoxins of diphtheria or the streptococcic serum are injected

into the system of the patient his blood is more active in clotting. Having noticed some reports of the value of this remedy in grave hemorrhages, I had occasion to try it in a small number of cases. It is very difficult to prove my contention, unless I would have employed the clotting tests by the elaborate methods, but I am quite certain that the cases were very materially influenced by the injection of 10 c. c. of serum, once antistreptococcic and twice antidiphtheric.

GROUP V. THERAPEUTIC MEASURES IN THE PRODUCTION OF EPIDERMIS.

Scarlet Red.—The interesting experiments that led to the discovery of the action of this remedy are too lengthy to dwell upon here, but I may say that they were scientifically proven and accepted. When a quantity of scarlet red, which is an anilin dye, comes in contact with a granulation surface, and there is in the vicinity an epithelial margin, there will result a positive and rapid migration of epithelial cells. After having read of the splendid results in amputation stumps and ulcerations of the leg, I decided to employ it, and am prepared to state that in every instance have I demonstrated rapid epidermization of raw surfaces. The conditions in which I used it are:

1. After-treatment after radical mastoid operation.
2. Small perforations of the tympanic membrane.
3. Small ulceration of the septum, especially after operation in one case of a small perforation, causing whistling.
4. Tubercular ulcer of the skin in an incision following resection of tubercular glands.

The technic is to apply either the powder or a 10 per cent ointment over the area and keeping it in contact for forty-eight hours, when it is again changed. In the perforation of the tympanic membrane there was no trichloracetic acid used.

GROUP VI. THERAPEUTIC MEASURES IN THE PREVENTION OF LOCAL AND GENERAL INFECTION.

(a) *Tincture of Iodin.*—This old therapeutic remedy has in the last two years sprung into great prominence in the preparation of the field of operation. I have in all my cases in the last year and a half, just before operation, covered the surfaces with 10 per cent of the tincture of iodine in alcohol without first

scrubbing or washing the parts. If it is an operation of choice, that is, a mastoid, external sinuses, face or neck operation, then the parts are thoroughly scrubbed the day before, but in emergency cases I do not scrub at all—only wash with alcohol and ether, followed by tincture of iodine. There results less infection of the skin after operation. I have lately adopted the practice of painting the mucous membrane of the nose and throat with the tincture of iodine before operating, after the parts are thoroughly cocaineized; also the vestibule of nose and external auditory canal before operating in the nose or ear.

(c) *Urotropin*.—The second remedy is the routine employment of urotropin before and after operations on the nose and ear. Cushing and others of Johns Hopkins Hospital found this remedy of value in preventing and curing infection of the cerebrospinal fluid when given in very large doses, say about 100 gr. daily. They advanced the idea that this drug, in liberating a free formalin in the blood, reached the cerebrospinal fluid and caused it to become less liable to infection.

Since the reports of these gentlemen I have employed urotropin in large doses before and after each operation of the ear and nose, especially mastoid and sinus diseases. The proof that any case of infection was prevented is impossible in my experience, except that I have had no case complicated by meningitis, and some cases that came with this symptom appeared to be beneficially influenced by urotropin.

XVIII.

REPORT OF TWO CASES OF BRAIN ABSCESS IN
THE FRONTAL LOBE, SECONDARY TO ETH-
MOIDITIS AND FRONTAL SINUSITIS.

By JOHN MCCOY, M. D.,

NEW YORK.

Brain abscess of nasal origin is of comparatively infrequent occurrence, according to a study of the literature of this subject. The writer feels, however, that it is of more frequent occurrence than is generally conceded, and that by a detailed recital of the histories of such cases as come into our practice, be they of favorable or unfavorable issue, we shall be able to recognize the affection at an earlier stage and, therefore, secure increasingly better results, and we shall be able to employ such surgical expediciencies as may have been found useful by other observers. The following cases came into my practice during the past year, and were found to be so absorbingly interesting that a detailed recital was thought worthy of recording. The first case was referred to me on October 15th, 1909, with the following history:

John L.; age, one year six months. The family history was negative as to syphilis, cancer or tuberculosis.

Previous history: Had always been in good health until he had an attack of pneumonia, six weeks before coming to my office. One week after he had been cured of the pneumonia, which lasted about seven days, his left upper eyelid became red and swollen, and three days later the right upper eyelid also became red and swollen. He was seen by an eye specialist, who incised the swelling in the eyelids on the outer and inner aspect of each. The incisions evacuated pus, and the wounds were dressed every other day for six weeks, while a constant discharge of pus came from them. Toward the end of this time the forehead also became edematous. The case was then referred to the writer, and on examination the baby presented the following appearance: Both upper eye-

lids were edematous and each had two fistulous openings which were discharging pus. The forehead was edematous. A probe introduced into the fistulous openings discovered eroded bone. Examination intranasally showed the middle turbinates tightly wedged between septum and outer wall. No pus was to be seen in the nose. A diagnosis was made of ethmoiditis on both sides, perforating the orbital plate, and the child was sent to have an X-ray picture made. The X-ray picture showed the appearance in Figure I. Operation was advised. October 19, 1909, operation was made through the incisions, as indicated in dotted lines in Figure II. First the right frontal and ethmoid region were exposed. While there was not a distinct frontal sinus on either side, still there was a distinct cavity between the outer and inner plates, with a distinct frontonasal duct. The outer plate was found necrotic over this frontal area and extending up on the forehead as high as could be followed through the incision. The orbital plate of the ethmoid was found to have two perforations. The right frontal and ethmoid regions were now thoroughly cleaned out and the left side was next attacked. Here a very similar condition was found, with three perforations in the orbital plate, and extensive necrosis of the frontal and forehead region was found. This side was also cleaned out thoroughly. Then an incision was made from the midforehead region to the vertex, and from the middle of this incision a horizontal incision across the forehead. This incision disclosed an osteomyelitis extending clear up to the vertex, also an epidural abscess on left upper forehead and vertex region, $1\frac{1}{2}$ inch vertically and 1 inch transversely (See Figure III). The whole diseased area was thoroughly curetted and cleansed and the wounds drained. There was a postoperative rise of temperature to 103° , but it subsided to normal in four or five days. The wounds were dressed every other day, and on the tenth day after operation (October 29th) the child left the hospital in good condition, and was brought thereafter to my office for future dressings.

November 6th. Child taking its nourishment well; wounds healing kindly.

November 9th. Child had a spell of vomiting and has been drowsy for past twenty-four hours. At the dressing the right arm and leg seem to be much weaker than left.



Figure 1. Represents area of osteomyelitis as shown on X-ray plate.

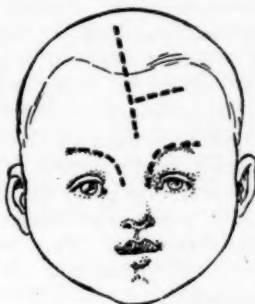


Figure 2. Dotted lines indicate the incisions made at operation.

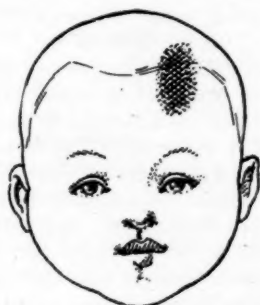


Figure 3. Represents the area of epidural abscess.



Figure 4. Area of epidural abscess.



Figure 5. Indicates place of counter opening in temporal region.

November 11th. Parents say the right arm and leg were completely paralyzed. Child bright, taking its nourishment well. Wounds healing splendidly. Referred to neurologist.

November 13th. Has been seen by a prominent neurologist, who says there is no indication of intracranial involvement. He thinks the paralysis due to pressure by the dressings upon the brain in the region of the epidural abscess and that it would clear up when the dressings were discontinued. Eye grounds were not examined and no blood count made.

November 17th. Paralysis still continues; baby bright and takes nourishment well. Wounds healing splendidly. Temperature 99.2°.

November 21st. Baby began vomiting in the morning. This continued until the next day, when he sank into coma. The writer was called to the home and found the child in a state of complete coma, pulse 160, extreme pallor, cold extremities.

The baby was immediately removed to the hospital, where the old wounds were first opened, to see if any path into the brain existed. It seemed too bad to have to reopen them, however, they had healed so nicely. The frontal lobe was then entered through the dura, uncovered over the epidural abscess at the original operation. Immediately there gushed forth a great quantity of pus, toward the end mixed with cerebrospinal fluid. On inspection through the encephaloscope it seemed as if the entire frontal lobe had disintegrated. The cavity was packed with iodoform gauze, and under stimulating treatment the child rallied for twenty-four hours, so that when it was dressed next day it was semiconscious. He sank rapidly after this, however, with all the indications of rapid involvement of the ventricles, and died the following day. The pneumococcus was found in the ethmoid pus and in the pus from the brain abscess.

CASE 2.—Herbert E.; age, 10 years. Family history was negative as to syphilis or tuberculosis. Had pneumonia twice when a baby; also has had measles and chicken pox. About July 25th, 1909, began to have pain over the left eye. After suffering with this for four or five days, the upper eyelid became red, painful and very much swollen. This swelling was poulticed for one week at the suggestion of the local physician, and on August 6th the swelling was incised at the

outer angle of the eye. On August 13th he was seen and operated on by a very competent eye surgeon. The frontal sinus was exposed through a Killian incision. The frontal sinus was relieved of considerable pus and thoroughly curetted, together with some anterior ethmoidal cells, and the frontonasal duct was enlarged. A piece of gauze drain was passed down through this duct and allowed to remain. The external wound was completely sewed up and healed by primary union. The gauze drain through the nose was removed little by little in several days. The boy apparently did fairly well for a period of five weeks, having, however, during this time more or less constant headache and intermittent discharge of pus through the initial small incision in the upper eyelid. On September 20th the writer saw the patient for the first time. At this time he had developed a swelling on the left forehead, about one-half inch below the hair line. This swelling was incised, and a large epidural abscess (See Figure IV) was found leading down to and connecting with the frontal sinus. An area of necrotic bone was removed, about $1\frac{1}{2}$ inches wide and 2 inches long, down to and including part of the posterior wall of the frontal sinus. The dura, which was covered with thick granulations, was curetted and was found to be intact. The wound was allowed to heal by granulation, which it did very kindly, except at the extreme lower end, where a fistula, which led from the frontal sinus down into the ethmoid cells, persisted. During the healing of this wound, however, the headache, which at first disappeared entirely, later came on intermittently. The boy would go for a period of a week or ten days or two weeks, feeling in splendid health, eating well, sleeping well and was very bright and active. Then suddenly he would be attacked with a severe headache referred to the region over the opposite eye. He would become drowsy and have nausea and some vomiting. These attacks lasted for a period of from 12 to 24 hours, and would as suddenly cease, and again the boy become bright and active. His temperature and pulse and urine were normal. This continued until November 18th, when it was decided to more thoroughly remove the ethmoid cells than had been done at the first operation, with the feeling that perhaps there was an epidural collection of pus in this region making intermittent pressure on the dura and discharging through the fistula.

On November 18th the ethmoid labyrinth, in which polypi and granulations were found, was thoroughly removed. A small area of dura was found uncovered over the anterior ethmoid cells. The patient did remarkably well after this operation, and in two days was as bright and alert as usual. On November 24th, however, six days later, he had another spell of severe headache, drowsiness and vomiting, and this continued until the next day, November 25th, when he was seen by a neurologist, as the writer now felt that the trouble was in the brain. When seen by the neurologist, his attack had passed off and the boy was so bright and alert mentally that he decided that there was no brain abscess present. The eye grounds showed slight congestion of the disks. That night, however, the patient had two convulsions, and on the following day the writer felt justified in entering the brain. Accordingly the skin was raised from the dura over the old epidural abscess, near the outer end of the eyebrow. After penetrating the brain for about one-half an inch a large abscess was found, containing about one and one-half ounces of pus. A rubber tube was inserted for drainage and the boy returned to bed. The wound was dressed daily, but he did not do well. The rubber tubing became clogged with brain tissue and the abscess did not drain. Iodoform gauze, covered with gutta-percha tissue, was next tried, and this also seemed to fail, as the boy's condition steadily grew worse. His temperature mounted to 105°, his pulse to 140 and his general condition was somnolent or delirious. On the fifth day after opening the abscess a second connecting abscess was found, containing an equally large, if not larger, amount of pus. It extended deeper into the brain and more toward the base. The boy was returned to bed in a very precarious condition. The writer felt that the downward trend of the patient and the second abscess were a result of incomplete drainage of the first, and that if anything were to be accomplished it would be as a result of more efficient drainage. Accordingly on the following day, while the patient was in a very low state—at times it was almost impossible to feel his pulse—a section of bone three-fourths inch in diameter was removed from the side of the skull in the temporal region (See Figure V), about two inches back from the outer end of the eyebrow, and on a line just above it. An opening was then made into the abscess

cavity from this point. Iodoform gauze was now inserted into the abscess cavity both from the front and the side opening. An estimate of the size of the cavity may be obtained from the fact that two strips of gauze, each 12 inches long and 1 inch wide, were almost all packed into it. Practically from this moment on the patient progressed to recovery. The wounds were dressed daily. The cavity was swabbed with peroxide and iodoform gauze inserted in both openings. Two smaller subsidiary pockets were found during the next two weeks, one passing in toward the median line and one passing up toward the vertex. The temperature gradually sank to normal, and the patient gradually recovered the use of all his faculties. At first he was troubled with dreadful nightmares and with loss of memory for recent events, also incontinence of urine during sleep. These, however, have all disappeared. The drainage was entirely withdrawn from the front wound at the end of five weeks and from the side wound at the end of eight weeks. There is a hernia cerebri from the front wound, which at first was the size of a large walnut, but which has gradually diminished until to-day it is the size of a chestnut. There has never been a hernia from the side wound. It was deemed best not to interfere with the hernia from the front wound, as it was impossible to cover it with bone or skin on account of the large removal of bone at the time the epidural abscess was treated.

The eyegrounds were looked at about two weeks after first opening the brain and showed well-marked choked disk. The vision to-day is 20/40 in the right eye and about 5/200 in the left eye.

There was no aphasia at any time during the illness.

A critical review of these two cases leads the author to believe:

1. That the path of infection in both of these cases was by way of necrosis and destruction of the inner plate leading to epidural abscess, and thence to the frontal lobe by way of the blood vessels.
2. That the abscesses both went through a latent period and that the symptoms which ushered in the manifest stage were those of drowsiness, vomiting, and headache, and that these symptoms were intermittent and delayed, because in each of these cases a certain amount of skull had been removed, owing

to the presence of the epidural abscess, and this produced a state of decompression.

3. That because of this the abscess in the first case, insidiously enlarged until it finally invaded the lateral ventricle and therefore produced symptoms so severe and so quickly fatal.

4. That the surgical expedient of making a counter opening in the temporal region in the second case was unquestionably the means of bringing about a favorable issue in that patient.

157 W. 73rd Street.

XIX.

OBSERVATIONS ON THE PATHOLOGIC CONDITIONS OF THE NOSE AND THROAT, WITH SPECIAL REFERENCE TO THE TUBAL REGIONS, ASSOCIATED WITH CHRONIC CATARRHAL OTITIS MEDIA.*

(A STUDY OF FIFTY CASES.)

By HAROLD HAYS, A. M., M. D.,

NEW YORK.

Among the numerous diseased conditions with which the aurist has to deal, there is none which is so baffling and none which means more to the patient than chronic catarrhal otitis media. It is not my intention in this paper to bring forth any new and startling facts. I shall merely attempt to outline the more important pathologic conditions of the nose and throat which directly influence the tubal regions, and secondarily the middle ear. One other point that I hope to make manifest is that we should not lose sight of the great importance the general condition of the patient plays in almost all middle ear disease. Although we have to treat a local condition, the aurist must have the circumspection and acumen of the internist, and must often look for causes outside of the nose and throat if he wishes to effect a cure.

There are two forms of chronic middle ear catarrh, the latter of which is usually a gradual gradation of the former. The first to which I refer is the adhesive variety, the second, the interstitial variety, where lime deposits occur in the muscular walls of the blood vessels and where osteomyelitic changes occur in the ossicles and their attachments, causing ankylosis. In this series of cases I have made no attempt to differentiate the two conditions, for in the facilities usually offered in the

* Read before the Otological Section of the New York Academy of Medicine, January 14th, 1910.

clinics, hearing tests with tuning forks, watch and voice are almost out of the question.

The diagnosis of chronic catarrhal otitis media in these cases was made on simple clinical findings, which may be divided into subjective and objective.

Subjective Symptoms.—By far the majority of these patients complained of tinnitus. There were roaring sounds, buzzing, tingling and whispering. In some cases the tinnitus was almost unbearable. In others, the symptoms occurred only at night. The second symptom most often complained of was deafness, which also varied in degree from a slight "hardness of hearing" to almost total deafness. Another important complaint in a few cases was a radiating or neuralgic pain in the temporal region, extending over the eye on to the cheek. Among minor symptoms may be mentioned postauricular pain, cracking in the throat extending to the ears, tickling sensations around the eustachian tube and in the external auditory canal.

Objective Symptoms.—The objective symptoms were few. The drum membrane was retracted, it had lost its luster and was more or less opaque. The outlines of the malleus, in relation to the drum, stood out prominently. Watch test showed a diminution of hearing from zero to approximately six inches.

In the study of these cases, I examined about seventy patients.* I have indifferently taken fifty cases as a basis of classification. Besides examining the ears in every case, the anterior nares were carefully examined, the throat was inspected and the nasopharynx (including, of course, the eustachian openings, prominences and fossa of Rosenmüller), in every instance was examined with the pharyngoscope. In the course of study of these cases, particularly in private practice, the elimination or correction of the pathologic condition found, brought about decided relief.

For the purpose of completely studying and classifying the conditions of the nose and throat which would have any bearing on the catarrhal otitis, I tabulated the appended table. This table includes the sex of the patient, age, the ear or ears affected, nasal abnormalities, throat abnormalities, naso-

* The clinic cases were studied in Dr. Lewis' clinic at the New York Eye and Ear Infirmary. I am indebted to him for allowing me to use this material.

pharyngeal abnormalities, condition in the fossa of Rosenmüller, condition of the tubal orifices (the two latter including the promontory), the patency of the tubes and remarks about special cases.

I shall give but a brief resumé of these pathologic conditions which in many instances are responsible for the tubal condition and indirectly responsible for the chronic catarrhal process in the ear.

Fifty cases are tabulated. Of these, thirty-four were males, sixteen females. The age of these patients varied from five years to seventy years, the average being thirty-three years. Dividing the ages into decades, we find in the first, one case; the second, five cases; the third, nineteen cases; the fourth, eight cases; the fifth, six cases; the sixth, nine cases; the seventh, one case; the eighth, one case. The majority of cases, therefore, occurred in the third decade or between the ages of twenty and thirty.

The right ear was affected five times; the left ear five times; both ears, forty times.

NASAL ABNORMALITIES.

Out of the fifty cases tabulated there were only four that did not suffer from some pathologic condition in the nares. By far the majority of the cases had some pathologic bone condition, such as a deviated septum or hypertrophy of the turbinates. Naturally, the abnormality was not confined to any one particular part of the nose, but was complex in so far as a deviated septum, for example, was accompanied by hypertrophy of turbinates, hypertrophic rhinitis, accessory sinus disease, etc. As I mentioned before, the pathologic condition in the nose in many cases was directly responsible for an abnormal condition in the nasopharynx, especially around the tubal orifices and therefore indirectly responsible for the catarrhal condition of the ears.

The nasal septum was abnormally deviated, that is, enough to need correction, in twenty-four cases. It was deviated to the right in sixteen cases, to the left in six cases and a marked sigmoid deviation was present in two cases. It will be noted that the majority of patients suffered from a catarrh of both ears, no matter which way the septum curved. On the right side there were five cases where the deviation and the abnormal

condition of the ear corresponded; on the left side, three. This is explained by the fact that the deviation alone was not responsible for the pathologic change. For example, the deviation was accompanied by hypertrophy of the middle turbinates in eight cases, by hypertrophy of the inferior turbinates in one case, by accessory sinus disease in one case. Again we find but two cases suffering from hypertrophy of the middle turbinates unaccompanied by deviated septum. Hypertrophy of the inferior turbinates was present four times, i. e., one case with hypertrophy of both turbinates, one case of hypertrophy of right, one with hypertrophy of left, one associated with deviation of septum (both). Accessory sinus disease was discovered in two cases, one with deviation of the septum. There were seven cases with simple hypertrophic rhinitis and six with atrophic rhinitis, where no bone abnormality was observed. If we add to these the four cases where no nasal abnormality was found, there were seventeen cases which did not need operative treatment.

THROAT ABNORMALITIES.

Mention of these cases is made because the tonsil particularly has a direct bearing on a pathologic condition of the tubes.

In this series, the tonsils indirectly affected the ears in ten cases. They were hypertrophic in six cases, atrophic in four. The tonsillar condition was in all cases associated with some pathologic condition in the nose, so that it was impossible to say which was the more responsible. Moreover, this association of conditions produced an abnormal or unhealthy condition of the nasopharynx. In three cases the hypertrophied tonsils were associated with small adenoids in the pharyngeal vault. In the other cases there was usually a congestion or hypertrophy of the mucosa of the nasopharynx. Besides the question of infection and chronic hypertrophy of the pharynx, the enlarged tonsil may cause obstruction by the pushing backward of the posterior pillar of the fauces and by interfering with the muscular action of the tubes.

Four cases showed extreme congestion of the mucous membrane of the throat. One case was associated with congestion of the nasopharynx, the second with a hypertrophic condition, the third with mucus obscuring the entire picture, and the fourth with atrophy and anemia of the membranes around the tubes.

This last case is accounted for on the supposition that the condition had gone on for so long a time and retroactive changes were taking place.

NASOPHARYNGEAL ABNORMALITIES.

A survey of the nasopharyngeal condition with which chronic middle ear catarrh is associated, reveals a variety of pathologic pictures, which are more or less familiar. Some of these conditions are an extension process from disease elsewhere, either in the nose or the throat. Such a state of affairs is but natural when one considers that there is a direct contiguity of mucous membrane and that no hard and fast anatomic dividing lines can be made. In other cases, the pathologic condition is more extensive in the nasopharynx than the process from which it in all probability arose in the nose. I refer particularly to the cases of atrophic nasopharyngitis, of which more will be said later.

However, many nasopharyngeal conditions are idiopathic; in other words, the pathologic changes arise from the nasopharynx and are mainly confined to it. Even this statement must be qualified to a certain extent; for abnormalities (of a different nature, perhaps) were found in the nose and throat, which may have been either caused by or been the cause of what I have considered the idiopathic nasopharyngeal condition. I refer mainly to the cases where adenoids were present or glandular hypertrophy, commonly called hypertrophied lymphoid tissue.

The point must here be made that the abnormal conditions in the nasopharynx need not be in close proximity to the tubes in order to cause a middle ear catarrh. For any abnormal condition here present will affect the tube by causing an alteration in its mucosa or by causing an excessive secretion of mucus or by causing the formation of bands in the fossa of Rosenmüller.

The pharyngoscope was an invaluable aid in making these examinations. I was thus able to study closely the pathologic conditions present. In a certain number of cases (about 5%) the nasopharynx could not be seen plainly until cocaine was applied to the pharyngeal wall and uvula, which, of course, altered somewhat the picture seen. In one case, there was such extreme laxity of the soft palate and uvula that these

acted as a curtain flapping on the tongue and dropping on the lens of the instrument, thus cutting off any view of the nasopharynx.

Analyzing the cases, we find that there are nine different pathologic pictures of the nasopharynx presented in this series. Of course, there are other conditions which might be added by studying a larger number of cases, such as benign and malignant growths. There were five cases with small adenoids in the vault, extending into one or both fossæ of Rosenmüller, overhanging the eustachian eminence and thus blocking up both tubes. There was one case of a large adenoid overhanging both tubes, eleven cases of atrophic nasopharyngitis, seven cases of hypertrophic nasopharyngitis, one case of granular hypertrophy, six cases of glandular hypertrophy (or hypertrophied lymphoid tissue), four cases with mucus with no ascertainable pathologic condition in the nasopharynx, three cases of simple congestion and one case of extreme hypertrophy of the posterior ends of the inferior turbinates.

The association of adenoids with middle ear disease is so frequent that it is common knowledge that in order to effect a cure of the ears the adenoids must be removed. In these five cases, where the adenoid was small, the primary growth had been sufficient, by the extension of lymphoid tissue, to obstruct one or both tubes. It is apparent that merely the removal of the small growth would be insufficient for the cure of the ear condition. The masses (and adhesions) in the fossa of Rosenmüller and over the eustachian eminences had to be removed. Inattention to this matter has often resulted in the failure of the cure of the patient. These masses often cannot be cleaned out with the curette, but recourse must be had to a small adenoid forceps or the finger. Moreover, it may be necessary in these cases, to continue office treatment for some time, breaking up adhesions, applying caustics, etc. In the case of a large adenoid, like the one mentioned above, the matter is much simpler, as the mass may come away in toto, thus establishing ventilation and getting rid of the offending obstruction. There is another class of small adenoids (which I shall speak of later) that causes no obstruction and merely acts as an irritant in the fossa of Rosenmüller.

ATROPHIC NASOPHARYNGITIS.

It is rather surprising to see the number of cases of atrophic nasopharyngitis—over twenty per cent. I have classified here all cases in which there is a marked degree of anemia, the presence of tenacious mucus, and marked retraction of the mucosa in the tubal orifices and on the promontory. All of these cases present symptoms and pathologic alterations which are more or less the same. There may or may not be an associated atrophy in the nose and throat. The mucosa presents a peculiar glistening appearance, which is characteristic, but hard to describe. In many instances small tendrils of connective tissue can readily be seen extending from the eustachian prominence into the fossa of Rosenmüller. It is particularly this class of cases which need the attention of the internist, for nothing of lasting benefit can be accomplished in the throat or ear until the body is taken care of. Some of these cases did very well on compound rhubarb and soda mixtures, with some massage of the drums and the application of the silver salts. These two latter procedures were of secondary importance. There were three definite varieties of this condition seen—(1) Atrophic cases with mucus; (2) atrophic cases without mucus; (3) atrophic cases with crusts.

1. *Atrophic Cases With Mucus.*—A large proportion of the cases showed the presence of mucus somewhere in the nasopharynx, varying in character and amount. In many instances, the mucus was thick and stringy, and could only be removed by repeated postnasal douching with alkaline solutions. Strings of mucus could be seen extending from the posterior pharyngeal wall into the fossa of Rosenmüller. Often the eustachian orifices were completely plugged with mucus. It was surprising in the cases where postnasal douches were given to note the immediate improvement in the ear condition without resource to any other procedure.

2. *Atrophic Cases Without Mucus.*—These were the least advanced cases where the atrophic condition could be readily studied on account of the roominess of the nasopharyngeal space. The mucous membrane was extremely pale, glistening and in many cases dry. Either the same condition was present in the nose or a hypertrophic rhinitis of long extent going into the state of atrophy. The eustachian tubes were wide

open, and the fossa of Rosenmüller showed as a deep recess more or less filled in with adhesions.

3. *Atrophic Cases With Crusts.*—Crusting took place only in the advanced cases. But it was precisely in these cases that the tinnitus was so severe as to well-nigh cause insanity. In one case the patient had a movable tongue and was able to clean out his nasopharynx by inserting the tip of the tongue behind the soft palate. In another case the crusts in the region of the eustachian tubes were so thick, heavy and hard that only by prolonged washing and manipulation with an applicator were they dislodged.

HYPERTROPHIC NASOPHARYNGITIS.

These cases were characterized by an increase in connective tissue elements and a thickening of the mucosa. There were seven such cases. The mucosa presented a congested appearance, at times was edematous or boggy, and often was thrown into folds between which there frequently lodged some mucopurulent secretion. The reduplication in certain instances extended over the eustachian tubes.

There was one case of so-called granular hypertrophy which was associated with a hypertrophic condition. The mucosa presented a "granulated" appearance, as if it had been sprinkled with fine granules of lymphoid tissue.

Glandular hypertrophy or hypertrophied lymphoid tissue in the nasopharynx was seen more often. Such a condition was observed in six cases. The hypertrophied follicles stood out in isolated patches and often extended well down on the pharyngeal wall. A hypertrophied lingual tonsil was usually present. Adenoid tissue was seen in the vault in some instances. In one case, the eustachian eminences were dotted with lymphoid follicles extending well into the tubal orifices and backward into the fossa of Rosenmüller.

There were four cases with so much mucus in the nasopharynx that no definite examination of the parts could be made. These were all clinic cases, where there were no conveniences for postnasal washing.

The three cases included under the heading "Congestion" were cases where there was no evidence of thickening, but merely an engorged appearance of the mucosa. As soon as the congestion was relieved by appropriate local measures and

depletion of the general circulation, the ear symptoms, at least temporarily, would disappear.

There was one case recorded of hypertrophy of the posterior ends of the inferior turbinates, where the increase in tissue directly infringed on the tubes. This condition probably occurs more frequently than is suggested in this series, more often in association with abnormal conditions elsewhere in the nose.

CONDITION OF THE TUBAL ORIFICES.

The pathologic alterations which occur in or around the orifices of the eustachian tubes are, in the majority of instances, but an extension process from lesions elsewhere, either in the nasopharynx or nares. There are some few exceptions to this rule, in which a close study of the eustachian tubes and adnexa shows that the main lesion is confined to these parts.

Let me say here that the pharyngoscope proved its greatest value in the study of these parts. In each case I spent a considerable length of time interpreting the abnormality, sometimes after freeing the nasopharynx from mucus by the post-nasal douche.

The pathologic conditions studied may be divided into six groups:

1. Congestion 6 cases
2. Anemia 6 cases
3. Hypertrophy 10 cases
4. Lymphoid hypertrophy 4 cases
5. Atrophy 6 cases
6. Adenoids 3 cases
7. Mucus with an atrophic condition of
the nasopharynx 3 cases

1. *Congestion*.—The eustachian orifices and surrounding parts presented a bright red appearance, which quickly disappeared upon the application of cocain and adrenalin. The ears felt "full," and the diminution in hearing and tinnitus were remittent, depending greatly upon atmospheric conditions and the constitutional stability of the patients. At times the eustachian openings appeared merely as small slits in the mucosa, and no deep sulcus could be seen. (Fig. 1.)

2. *Anemia*.—The cases of anemia were in every instance associated with a general anemia. The pathologic process had

not existed far enough to be classified as atrophy. There was some slight retraction. Stimulating applications would temporarily relieve the condition in many cases. But, as I stated previously, these patients needed general treatment, and no amount of "nasopharyngeal meddling" would do any good.

Hypertrophy.—Here, again, the cause of the condition was probably not inherent in the nasopharynx. General systemic symptoms brought about a local picture of hyperemia, with considerable thickening of the mucosa, which often was thrown into folds or plications around the eustachian tubes. However, local treatment met with considerable success. The diagnosis of the condition was often made by inserting an applicator through the nose to the eustachian prominence and sounding the mucosa. Observation at the same time with the pharyngoscope revealed an edematous mucous membrane which, when lifted up, showed a deep red, thick, eustachian opening. One case I recall where the mucosa was so thickened that a portion of it sagged down from the left eustachian prominence (Fig. 2), directly closing off the tube. The right tube was normal. The direct application of trichloroacetic acid three times, at intervals of a few days, to the promontory, in a linear streak, by means of an applicator passed through the inferior meatus, caused a decided amelioration of the symptoms.

Lymphoid Hypertrophy.—The four cases here recorded showed lymphoid excrescences on the eustachian eminence extending down into the tubal orifice. These small nodules were indefinitely placed, but were discrete and appeared as pinhead thickenings, varying somewhat in size, but never measuring more than a few millimeters in diameter. They were raised above the surrounding parts, and it was plainly evident that they were composed of lymphoid tissue because an associated lymphoid hypertrophy was often present in other parts. The eradication of this tissue, together with the reduction in hypertrophy of the underlying basement membrane, often improved the condition considerably.

Atrophy.—I have spoken of the decided "roominess" of the nasopharynx in cases of atrophy. The same "caved-out" appearance applied to the regions around the eustachian orifices. The mucosa was decidedly retracted, was glistening in appearance, pearly gray and often crusts, thick and hard to

remove, were embedded in the eustachian orifices. (Fig. 3.) After the removal of these, one could see far into the eustachian tubes, sometimes as far as a half to one centimeter. The mucosa was sometimes cracked and fissured.

These cases are often relieved or even cured by treatment directly to the eustachian orifices without any effort being made to relieve intratympanic conditions. In fact, in many of these cases which could be followed closely, I found that the cleansing of the tubal orifices, with stimulation of the mucosa and general treatment for the upbuilding of the body, brought about such marvelous results that I let well enough alone and allowed the ears to take care of themselves.

Adenoids.—The adenoids mentioned, three cases, were characteristic in that in two of the three cases the masses were only evident in the fossa of Rosenmüller and overhanging the tubes. (Fig. 4.) In one case that I plainly recall, the adenoid was present on the left side only, resembling a fringelike excrescence. (Fig. 5.) A soft adenoid mass in this situation may do as much harm as a hard, organized mass elsewhere, not only because of the blocking up of the tubes, but because of the formation of adhesions resulting in retraction of the mucosa of the tube. Again, the presence of this foreign mass is liable to set up a peritubal inflammatory condition, the ultimate outcome of which is hyperemia or atrophy.

Mucus With an Atrophic Condition of the Nasopharynx.—Mention is merely made of these cases which have been described under atrophy (vide above). They were clinic cases, where the condition of the ears seemed to be due, in part at least, to the formation of crusts in the tubal orifices.

CONDITIONS IN THE FOSSA OF ROSENMUELLER.

Adhesions.—The presence of adhesions in the fossa of Rosenmüller is a condition very often present, but very often overlooked. In the fifteen cases cited in this series the adhesions were actually seen with the pharyngoscope. Their importance in the causation of chronic middle ear catarrh has been brought out by Bryant, Packard and others.

The adhesions that are seen show as fine fibrillary bands extending across the fossa from the mucosa of the eustachian eminence, backward and downward on to the pharyngeal wall. (Fig. 6.) As a rule, there is some retraction of the tubal mucous membrane.

I am of the opinion that adhesions are present in the fossa of Rosenmüller in all cases of chronic catarrhal otitis media. I have seen many cases where the catarrh was on one side only and adhesions present only on that one side. Where adhesions are not evident by pharyngoscopic examination, their presence may be made manifest by inserting the finger into the posteustachian recess. The fossa often extends downward and outward one to two centimeters, and the depths cannot be seen, but can be readily felt.

The breaking down of these adhesions will in many cases give great relief, and, in some instances, cures. Cocainization of the parts is unnecessary. The finger, corresponding to the fossa to be examined, is inserted deeply into the fossa and swept from above downward. To keep the adhesions from reforming I have, in some cases, been able to insert a piece of corgile membrane behind the tube, allowing it to remain there as long as possible.

In forty-four of the cases examined the tubes were found open in thirty-four cases, closed in eight. The only method used to determine this factor was catheterization. If air entered the middle ear, I considered the tube open. In two cases, one tube was open, the other closed. Of course, it is possible in some cases, where there was no perceptible drum vibration, that my technic in catheterizing was at fault. However, I believe that in many of those cases where air was forced into the middle ear, the catheter or the cocain used before instrumentation was largely responsible in establishing a temporary and unnatural patency.

I have attempted in this paper to bring out the important bearing that abnormalities of the nose and throat have in causing and increasing a middle ear catarrh. Although statistics as such are unreliable, I believe that in this series of cases we have been able to see many of the major pathologic conditions which impair the physiologic action of the eustachian tubes, secondarily resulting in the alteration in the sound-conducting apparatus of the middle ear.

The drawings were kindly made for me by Dr. Percy H. Fridenberg. I take this occasion to thank him.

11 West 91st Street.

No.	Case.	Age.	Ear Affected	Nasal Abnormalities.	Throat Abnormalities.	Nasopharyngeal Abnormalities.	Condition of Fossa of Rosenmüller.	Condition of Tubal Orifices.	Tubes Patent.	Remarks.
1.	S. S. (M.)	17	R.	Septum dev. to right.	Hypertrophied tonsils.	Small adenoid.	Adhesions.	Mucus.	Yes.	
2.	S. S. (F.)	35	L.	Septum dev. to left.	Atrophied tonsils.	Atrophic.		Atrophy.	Yes.	
3.	F. M. (F.)	19	R.	Septum dev. to right. Hyper. mid. turbs.	Hypertrophied tonsils.	Small adenoid.	Adhesions.	Mucus.	Yes.	
4.	A. S. (M.)	50	B.	Septum dev. to left. Hyper. mid. turbs.		Atrophic.		Thick tenacious mucus.	No.	
5.	J. M. (M.)	45	B.	Atrophic rhinitis.		Atrophic.	Adhesions.	Tubes anemic, high, narrow and dry.	Yes.	
6.	M. G. (F.)	5	B.	Hypertrophic rhinitis.		Hypertrophic.		Tubes small and congested.		
7.	J. S. (M.)	20	B.	Hypertrophic rhinitis.	Hypertrophied tonsils.	Small adenoids overhanging both tubes.	Adenoid tissue.	Overhung by adenoid tissue.	No.	
8.	S. G. (M.)	49	B.			Granular pharyngitis.	Adhesions.	Hyper. lymphoid tissue over tubes.	No.	

No.	Case.	Age.	Ear Affected.	Nasal Abnormalities.	Throat Abnormalities.	Nasopharyngeal Abnormalities.	Condition of Fossa of Rosenmüller.	Condition of Tubal Orifices.	Tubes Patent.	Remarks.
9.	M. H. (M.).	46	B.	Spur—left.	Congestion.	Congestion.			No.	Difficult to pass catheter. Absolute deafness.
10.	G. I. (M.).	20	B.	Septum dev. to right.	Congestion.	Atrophic.	Mucus.	Narrowed; Anemic.	No.	
11.	H. K. (M.).	27	B.	Hyper. mid. turbs.			Adhesions.	Hypertrophy.	Yes.	
12.	J. G. (M.).	19	B.	Hypertrophic rhinitis.		Small adenoids.			Yes.	
13.	E. K. (F.).	34	B.	Septum dev. to right.		Atrophic.	Adhesions.	Pale, retracted.	Yes.	Dev. corrected with improvement.
14.	J. E. (M.).	39	B.	Hypertrophic rhinitis.		Congestion.		Hypertrophy.	Yes.	
15.	E. W. (M.).	21	B.	Accessory sinus disease.		Thick mucus.	Mucus.	Hypertrophy.	Yes.	
16.	M. M. (M.).	41	R.	Dev. septum to right.		Congestion.	Mucus.	Lymphoid hypertrophy.	No.	

17.	E. B. (F.)	55	R.	Dev. septum to right.	Atrophic.	Atrophy.	Yes.	Cured after submu- cous resection.
18.	J. L. (M.)	26	L.		Adenoid.	Adenoid tissue.	Yes.	
19.	B. F. (F.)	20	B.		Large adenoid.	Adenoid tissue.	No.	Improvement after adenoidectomy.
20.	R. G. (F.)	50	B.	Hypertrophic rhinitis.	Hypertrophied lymphoid tissue	Adhesions.	Yes.	
21.	D. R. (M.)	34	B.	Atrophic rhinitis.	Atrophic.		Yes.	
22.	A. O. (M.)	21	L.	Hyper. inf. turbs.	Hyper. post. ends inf. turbs.		Yes.	
23.	B. W. (M)	50	B.	Atrophic rhinitis.	Mucus.	Mucus.	Yes.	
24.	J. H. (F.)	43	B.	Hyper. mid. turbs.	Hypertrophic small adenoid.	Tenacious mucus	Yes.	
25.	B. W. (F.)	50	B.	Dev. septum to right.	Curtain of soft palate over- hanging poste- rior nares.			
26.	L. D. (M.)	35	B.	Dev. septum to right. Hyper. mid. turbs.	Congestion. Hypertrophied tonsils.	Mucus.	Yes.	

No.	Case.	Age.	Ear Affected	Nasal Abnormalities.	Throat Abnormalities.	Nasopharyngeal Abnormalities.	Condition of Fossa of Rosenmüller.	Condition of Tubal Orifices.	Tubes Patent.	Remarks.
27.	M. I. (M.)	20	B.	Sigmoid dev. of septum. Hyper. mid. turbs.					Yes.	
28.	W. B. (M.)	37	B.	Hyper. inf. turb. (L.)		Lymphoid hyperplasia.	Mucus.	Lymphatic hypertrophy.	Yes.	
29.	M. T. (M.)	23	B.	Hypertrophic rhinitis.	Congestion.	Mucus.	Mucus.	Mucus.	Yes.	
30.	S. T. (M.)	30	B.	Dev. septum to left.			Adhesions.	Enormous hypertrophy of both eustachian eminences.	Yes.	
31.	Y. B. (F.)	50	B.	Atrophic rhinitis.		Atrophic.		Atrophy.	Yes.	
32.	C. K. (F.)	23	B.	Septum dev. to right.			Adhesions.	Retraction.		Improvement after submucous resection.
33.	A. C. (F.)	19	B.	Atrophic rhinitis.		Atrophy.	Adhesions.	Atrophy.	Yes.	
34.	J. B. (M.)	35	B.	Dev. septum to right.		Hypertrophied lymphoid tissue.		Retraction of tube.	Yes. (L.) No. (R.)	

35.	R. A. (F.)	44	B.	Dev. septum to right. Hyper. mid. turbs.		Hypertrophic.	Mucus.	Hypertrophy.	Yes.	
36.	P. A. (M.)	53	B.	Sinus disease.	Burled tonsils.	Hypertrophy.	Adhesions.	Congestion and mucus.	Yes.	
37.	A. L. (M.)	24	B.	Dev. septum to right. Hyper. mid. turbs.		Glandular hypertrophy.		Congestion.	Yes.	Improvement after submucous resection.
38.	A. B. (M.)	60	B.	Sinus disease with polyp. Dev. septum to right.		Thick mucus.	Mucus.	Mucus. Hypertrophy.	No.	No improvement after submucous and sinus operations.
39.	L. B. (F.)	20	B.	Hyper. inf. turbs.	Hypertrophied tonsils.	Glandular hypertrophy.		Hypertrophy.	Yes.	
40.	F. C. (M.)	25	B.	Hypertrophic rhinitis. Dev. septum to right.	Burled tonsils.		Adhesions.	Small adenoid over left tube.	Yes. (R.) No. (L.)	
41.	W. C. (M.)	16	B.	Sigmoid dev. septum. Hyper. inf. turbs.		Hypertrophic.	Mucus.	Congestion.	No.	Submucous resection. Inf. turbidectomy. Improvement.
42.	C. L. (M.)	22	L.	Dev. septum to left. Hyper. mid. turbs.		Hypertrophic.	Adhesions.	Congestion.	Yes.	Submucous resection. No relief.
43.	J. F. (M.)	59	B.	Dev. septum to right.					No.	

No.	Case.	Age.	Ear Affected.	Nasal Abnormalities.	Throat Abnormalities.	Nasopharyngeal Abnormalities.	Condition of Fossa of Rosenmüller.	Condition of Tubal Orifices.	Tubes Patent.	Remarks.
44.	S. G. (F.)	20	B.	Dev. septum to left. Hyper. mid. turbs.	Hypertrophied tonsils.	Hypertrophic.	Mucus.	Hypertrophy.	Yes.	
45.	M. L. (M.)	52	B.			Atrophic.	Adhesions.	Atrophy and retraction.	Yes.	
46.	H. M. (M.)	70	B.	Atrophic rhinitis.		Atrophic.	Adhesions and mucus.	Anemia and atrophy.	Yes.	
47.	J. M. (M.)	24	L.	Angular dev. septum to left.					Yes.	Submucous resection. Cured.
48.	F. N. (M.)	20	R.	Dev. septum to right.		Glandular hypertrophy.	Mucus.	Hypertrophy.	Yes.	Submucous resection. Cured.
49.	J. S. (M.)	29	B.	Hypertrophic rhinitis.	Enlarged, atrophic tonsils.		Mucus and adhesions.	Anemia and retraction.	Yes.	
50.	F. C.	24	B.	Hyper. inf. turbs.		Gland. hyper.	Adhesions.	Small adenoid.	Yes.	

SUMMARY.

Number of cases.....	50
Males	34
Females	16
Age:	
Youngest	5 years
Oldest	70 years
Average age	33½ yrs.
Number of patients in each decade:	
1 to 10.....	1
10 to 20.....	5
20 to 30.....	19
30 to 40.....	8
40 to 50.....	6
50 to 60.....	9
60 to 70.....	1
70 to 80.....	1
Ear affected:	
Right	5
Left	5
Both	40
Nasal abnormalities	46 cases
Deviations of the septum.....	24 cases
Right	16
Left	6
Sigmoid	2
Deviation of the septum associated with:	
Hypertrophied middle turbinates.....	8 cases
Accessory sinus disease.....	1 case
Hypertrophied inferior turbinates.....	1 case
Hypertrophied middle turbinates.....	10 cases
Associated with deviation of septum.....	8 cases
Hypertrophy of inferior turbinates:	
Both	1 case
Right	1 case
Left	1 case
Associated with deviation of septum.....	1 case
Accessory sinus disease.....	2 cases
Associated with deviation of septum.....	1 case
Hypertrophic rhinitis	7 cases
Atrophic rhinitis	6 cases
Cases not needing intranasal operative treatment.....	17
Throat abnormalities	14 cases
Hypertrophied tonsils	6 cases
Atrophied and buried tonsils.....	4 cases
Congestion of throat.....	4 cases
Nasopharyngeal abnormalities	39 cases
Small adenoid in vault (usually blocking up one or both tubes).....	5 cases
Large adenoid (overhanging both tubes).....	1 case
Atrophic nasopharyngitis	11 cases
Hypertrophic nasopharyngitis	7 cases
Granular hypertrophy	1 case
Glandular hypertrophy or hypertrophied lymphoid tissue	6 cases

Mucus in pharyngeal vault with no ascertainable pathologic condition in the nasopharynx	4 cases
Congestion of nasopharynx	3 cases
Hypertrophy of posterior ends of inferior turbinates.....	1 case
Condition in fossa of Rosenmüller.....	33 cases
Adhesions	15 cases
Mucus	13 cases
Adenoid tissue	3 cases
Mucus and adhesions.....	2 cases
Condition of the tubal orifices.....	37 cases
1. Congestion	6 cases
2. Hypertrophy	10 cases
3. Lymphoid hypertrophy	4 cases
4. Adenoids	3 cases
5. Atrophy	6 cases
6. Anemia, dry, narrow, retracted.....	5 cases
7. Mucus	3 cases

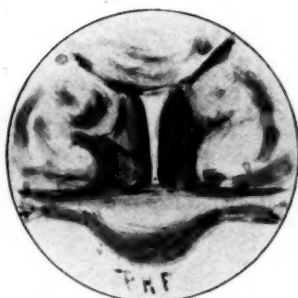


Figure 1. Congestion of the mucosa of the eustachian tubes and adnexa. The tubal orifices show merely as slits in the mucous membrane.

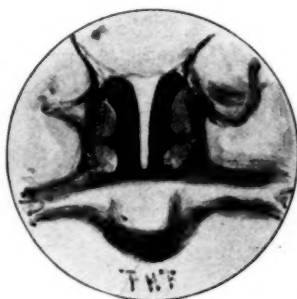


Figure 2. Prolapse of the mucous membrane of the left eustachian eminence, completely shutting off the tube. Cure effected by streaking the mucosa with trichloroacetic acid.

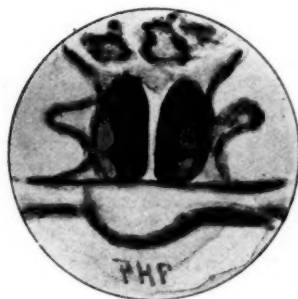


Figure 3. Atrophic nasopharyngitis, showing crusts in the vault and around the tubes. This illustrates the "roominess" of the nasopharynx and the caved-out appearance of the tubes.



Figure 4. Small adenoid directly overhanging the left tube.

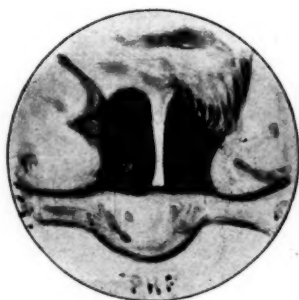
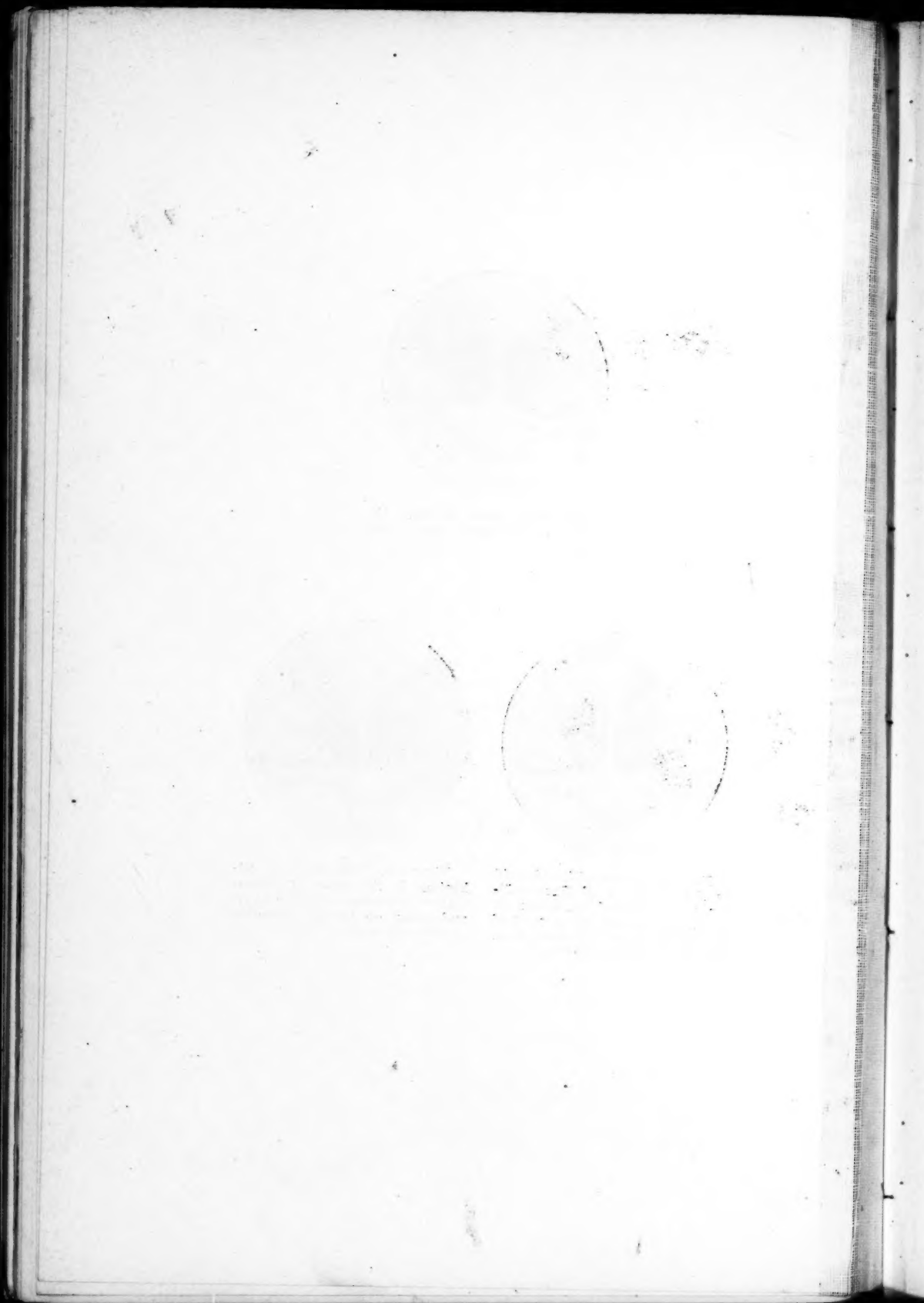


Figure 5. Fringe-like adenoid in the left fossa of Rosenmüller, which caused retraction of the tubal mucosa on account of the presence of intra-adenoid adhesions deep in the fossa.



Figure 6. Fine fibrillary adhesions in the fossa of Rosenmüller extending into the vault and down on to the posterior pharyngeal wall.



XX.

THE CLASSIFICATION OF MIDDLE AND INTERNAL
EAR DISEASES.*

By S. J. KOPETZKY, M. D.,

NEW YORK.

The need of a simple, logical and clearcut classification of ear diseases must be apparent to any of us who has consulted the standard American and foreign text books on otology.

The literature holds conflicting descriptions of lesions classified differently by individual authorities, who for the most part have made up their classifications partly from clinical pictures and partly from pathologic data.

Ear conditions were observed and studied, in the first place, entirely from the standpoint of symptomatology; secondly, a series of symptoms which arose from a circumscribed anatomic part of the whole ear, derived its name from the part seemingly mostly affected; it is furthermore noteworthy that the actual comprehension of the pathologic process evoking the clinical picture was a later study to observations obtained from the varying clinical pictures which patients having ear disease presented, and with the acquisition of the newer pathologic knowledge, old clinical terms sanctioned by usage were kept in use.

To these factors add the rapidity with which otology has developed within the extremely short period of recent years, and the causes for the confusing descriptions and terms in the current classifications will be better understood.

A classification, to stand the test of time and experience, must possess certain elementary basic facts which sharply differentiate the various conditions scheduled, one from another. To group a number of diseases, all affecting one organ of special sense—the ear—upon clinical data presented by symptoms of its involvement, that is, to form a schedule of dis-

*Read before the Section of Otology, New York Academy of Medicine, February, 1910.

eases upon symptoms, does not permit of sharply marked divisions, because the diseases attacking this one organ will naturally have many symptoms which are common to different lesions.

Again, the grouping of the diseases must be constant and permanent, irrespective of the stage of the disease when it is observed. Grouped clinically, this is not possible, for the picture necessarily changes as the disease progresses in its course, and a varying picture is observed when the disease is studied in different periods. (This seems self-evident, yet we still find classifications in recent text books which divide acute middle ear inflammations into acute perforative and acute non-perforative.)

Furthermore, a classification of diseases affecting one organ, to be practical, must group the diseases having common factors together. Regarding ear disease, a critical study demonstrates that this requirement is met by taking account of the etiologic factors of the lesions involving the ear.

Finally, the classification must be logical; it must show at a glance the interrelationship, the sequence of development, and the usual termination of the conditions thus classified.

A classification based upon actual lesions presented meets all the essentials enumerated above. The pathologic lesion is constant for the given condition; the causative factor inducing the lesions permit of an easy grouping; comprehension of the development of the lesions, tends toward a knowledge of sequelæ and a better understanding of symptomatology, and finally the lesion itself suggests the indicated medical or surgical therapeutic measures.

The classification presented herewith is therefore based upon ascertained pathologic facts.

Before discussing the details of the classification, a definition of the generic terms employed therein is in order.

The term "catarrh" has the sanction of usage and therefore is retained. It is here employed as an appellation possessing in itself no pathologic significance. It is held to be simply a name given a series of processes in the middle ear which are of a physical or a mechanical nature, and which are caused by factors situated away from the tympanic cavity proper. By "inflammation" is meant the reactionary phenomena, pathologically understood, which body tissue exhibits toward bac-

terial invasion. We are aware that, pathologically speaking, inflammations are the result of other agents besides pathogenic microorganisms. But we dislike the division of inflammation into simple and infective types, since in the condition with which we are called upon to deal, excepting possibly the early stages of otitis media neonatorum—a simple inflammation caused by foreign body irritants—all are of the infective inflammatory type. Our use of the term "inflammation" has therefore this meaning. By the term "general conditions" is meant the group of lesions which are the locally manifested signs of a general constitutional disease or condition, limited in its applicability to our present knowledge of these diseases and their characterizing lesions.

Finally, in order to make our divisions and groupings clear, certain facts regarding ear diseases must be conceded to be definitely established. The recognition of otosclerosis as a local manifestation of a general condition, postembryonal in nature, and characterized by a spongification of the labyrinthine capsule and new bone deposits at and around the footplate of the stapes, as held by Denker, Siebenmann and others, is one such pathologic fact.

That this disease has no connection with chronic catarrhal otitis media, pathologically speaking, is another fact.

We must acknowledge that acoustic nerve deafness, while possibly occurring as a terminal, and a secondary lesion to chronic catarrhal otitis, is often a distinct primary lesion, the local manifestation of various constitutional and therefore general conditions.

Finally, we must concede that the normal tympanic cavity is sterile, as held by Preysing; and that the ciliated epithelium of the eustachian tube keeps it sterile under the ordinary conditions of health, and that the causative factors of inflammatory reactions of the middle ear and its adnexa are pathogenic microorganisms.

With these facts established, the diseases of the middle and internal ear divide into three groups, basing the divisions upon etiologic factors, as follows:

1. Catarrhs.
2. Inflammations.
3. General conditions.

A glance at the definition of terms given above will explain .

the reason for their employment. Suffice it here to call attention to the absence of bacterial infection or infective inflammatory reaction in all the processes here classified as "catarrhs."

The primary incident, causing these "catarrhs" of the middle ear is located in the nasopharynx and the eustachian tube, and the phenomena we observed in the tympanic cavity is the mechanical resultant from a loss of patency of the eustachian tube and consequent failure of adequate aeration of the tympanic cavity. Noteworthy in connection with the so-called "catarrhs," in this classification, is the fact that the fluid sometimes noted in the tympanic cavity, in the acute cases, is in no sense the result of infection. It never is created in excess of the capacity of the tympanic cavity, and consequently there never is a bulging drumhead in the catarrhal cases. The fluid is the result of negative air pressure within the tympanic cavity, and to distinguish it from the purulent and mucopurulent fluid present in the inflammation it is termed a transudate in contradistinction to the exudate in the bacterial infections.

The catarrhs are subdivided into types of cases as follows:

A. *Acute Otitis Media Catarrhalis* (inclusive of the subacute form, which only differs from the acute in degree rather than type).

B. *Chronic Otitis Media Catarrhalis*.—The tubotympanic and tubal catarrhs of recent literature are grouped in these two divisions, since the catarrhal phenomena of any part of the tympanic cavity or adnexa, receive the generic name, "otitis media."

Inflammations of the middle ear structures are divisible into three classes of diseases, with their respective subtypes, as follows:

Inflammation.

1. *Acute Otitis Media Purulenta.*

- (a) Type affecting the new-born (otitis neonatorum, a non-infective inflammation).
- (b) Type involving only mucous membrane.
- (c) Type involving both mucous membrane and bone.

2. *Acute Mastoiditis.*

- (a) Type without pain or marked constitutional symptoms.
- (b) Type with pain and constitutional symptoms (classical signs).

3. *Chronic Otitis Media Purulenta (Chronic Mastoiditis).*

- (a) Type which is not dangerous.
- (b) Type which is dangerous (intracranial lesions threatened).

An additional word is necessary to place certain conditions still considered independent diseases to show where they are scheduled in this classification. Myringitis, acute and chronic, is an inflammatory condition due to bacterial infection of the tissues of the drumhead. It is rarely a primary lesion. The drumhead is the lateral (outer) wall of the tympanic cavity, and an infection of any part of this cavity is either an acute or chronic inflammation, and hence should be classified under the generic term "otitis media purulenta." Myringitis does not merit consideration as a separate disease. It would be just as logical to describe an ulcerative process in the mucous membrane over the promontory by a special term. Again, when the drumhead is affected secondary to a lesion of the external auditory canal, that is, in the course of an otitis externa, it is simply a coincidental lesion to the otitis externa.

When, on the other hand, it does occur as a primary disease, from trauma, it should be considered as an accidental lesion, and traumatic injuries necessarily cannot be classified logically. As a trauma, the result of direct or indirect violence, the tissue either becomes infected or remains clean. On the one hand, the lesion should be considered a simple incised, punctured or lacerated wound of the drumhead. On the other hand, if infected, it is an inflammation of a wall of the tympanic cavity and therefore, for reasons given above, should be classified as an otitis media purulenta.

I shall later, under remarks on the pathologic lesions here classified, outline the reasons for the subdivision into types as enumerated above.

Under General Conditions we group all those ear diseases and conditions, more or less independent of each other, which

show a constitutional basis, as for instance, the ear symptoms of tabes; those arising from the excessive use of tobacco, alcohol, or the ingestion of mineral or vegetable poisons, as quinin, or sodium salicylate; and those which result from the effect of toxins and general sepsis.

Under this heading we also group the "occupation-neuroses" affecting the ear. Roughly speaking, all these constitutional conditions result in an acoustic nerve deafness, which we use as the generic term for all these conditions.

Finally, under the heading of General Conditions, we find otosclerosis, in accordance with the views of Denker and Siebenmann. It is a general condition having local lesions, which, as far as these authorities have been able to demonstrate, is of a prenatal origin, and characterized by lesions which, according to Shambaugh, seem to follow the blood vessels of the labyrinthine capsule.

In a subsequent paper, I intend to carry this classification further, in an attempt to correlate the intracranial complications upon a system similar to the one here presented.

THE CLASSIFICATION.

Middle and Internal Ear Diseases and Their Complicating Lesions.	Division by Causative Factor.	Types and Names of Diseases.	Classification of Subdivisions and Subtypes.	Characteristic Otoscopic Finding.	Location of Characteristic Lesion.	Characteristic Symptoms.	Complications and Termination.
	I. Catarrhs.... (Produced mechanically.)	1. Acute Catarrhal Otitis..... (Subacute Catarrhal Otitis.)	.....	Drumhead red; retracted; Capillaries injected; Light-reflex small or absent. Transudate in tympanic cavity, in amount equal to negative air-pressure. No bulging presented.	Principal lesion in pharynx and eustachian tube.	"Colds" — pharyngeal symptoms from exanthemata. Transient deafness. Fullness in ears, occasionally tinnitus.	After bacterial invasion—O. M. P. A. Usually terminate in recovery. Occasionally in chronic cat. otitis.
		2. Chronic Catarrhal Otitis.....	.....	Retracted drumhead, pale. Occasionally deposits posterior and anterior folds at Prussak's space marked. Foreshortened malleus. Distorted light-reflex.	Principal lesion in eustachian tube and pharynx, and in membrana tympani and ossicles secondarily.	Mouth breathers in childhood. Repeated attacks of acute catarrh. Progressive deafness. Tinnitus.	Nerve deafness. Adhesion in tympanic cavity.

THE CLASSIFICATION.

Division by Causative Factor.	Types and Names of Diseases.	Classification of Subdivisions and Subtypes.	Characteristic Otoloscopic Finding.	Location of Characteristic Lesion.	Characteristic Symptoms.	Complications and Termination.
Middle and Internal Ear Diseases and Their Complicating Lesions.	I. Inflammations..... (Bacterial origin)	A. Otitis Media Neonatorum..	Bulging, red, drumhead; perforation.	Amniotic fluid in middle ear spaces.	Discharge (late).	Bacterial invasion—O. M. P. A.
		B. Otitis Media Purulenta Acuta..... (Mucous membrane involved only.)	Bulging drum. Perforation usually not in membrana flaccida and generally non-marginal. Discharge: mucopurulent.	Pus and microorganisms in middle ear spaces. Hyperplastic inflammation of mucous membrane lining tympanic cavity.	Pain, otorrhea. Temperature (in children). Transient deafness.	Any type of acute mastoiditis with or without its complicating lesions (usually not common).
		C. Otitis Media Purulenta Acuta..... (Bone and Mucous Membrane involved.)	Bulging drum. Perforation: generally in membrana flaccida. Discharge: distinctly purulent.	Pus and microorganisms in middle ear spaces. Inflammation of mucous membrane lining same, and bone destruction in aditus ad antrum.	Pain, discharge. Temperature (in children). Transient deafness.	Any type of acute mastoiditis with or without complicating lesions, promptly suppurates unless drainage is established.

THE CLASSIFICATION.

Division by Causative Factor.	Types and Names of Diseases.	Classification of Subdivisions and Subtypes.	Characteristic Otoscopic Finding.	Location of Characteristic Lesion.	Characteristic Symptoms.	Complication and Termination.
Middle and Internal Ear Diseases and Their Complicating Lesions.	II. Inflammations... (Bacterial origin)	1. Painless Type..	Perforation of drum; inordinately profuse and prolonged purulent discharge. Sinking of post-superior canal wall or narrowing of canal's lumen (in children). Glands at angle of jaw.	Pus in tympanic cavity and mastoid process intercellular bone destroyed.	Profuse, prolonged, purulent discharge. No pain on pressure.	Sinus thrombosis; acute labyrinthitis, meningitis:—or chronic otitis media purulenta.
		2. Painful Type.. (Fulminating Type) with Fistula in Cortex, Bezold's Mastoiditis, etc.)	Perforation, purulent discharge. Sinking of post-superior canal wall, or narrowed canal lumen. (Classical signs of mastoiditis.)	Cortex unaffected. No periostitis.	Deafness. General malaise.	Resolution.
				Pus in tympanum and mastoid process. Peristome swollen. Inflamed. Cortex perforated, or inner table perforated. Digastric groove seat of perforation. (Epidural or perisinus abscess.)	Pain on pressure. Swelling over mastoid region and other classical signs of mastoiditis.	Epidural, perisinus abscess. Sinus thrombosis; acute purulent labyrinthitis, meningitis (any type), or resolution, with or without O. M. P. C.

THE CLASSIFICATION.

Division by Causative Factor.	Types and Names of Diseases.	Classification of Subdivisions and Subtypes.	Characteristic Otoscopic Finding.	Location of Characteristic Lesion.	Characteristic Symptoms.	Complications and Termination.
Middle and Internal Ear Diseases and Their Complicating Lesions.			Perforation of varying size situated centrally (non-marginally).	Chronic suppurative process in the lining mucous membrane. Thickened and diseased mucous membrane of eustachian tube.	Deafness, discharge; mucopurulent; fetor occasionally present in children.	Acute exacerbation, or more properly, an attack of acute mastoiditis, with or without complicating lesions.
		1. Non-Dangerous Type.....	Adhesive bands. Granulomata and polypi.	Nasopharynx principally involved. Epithelial ingrowths (pseudocholesteatoma).		
	II. Inflammations..... (Bacterial origin)	3. Otitis Media Purulenta Chronica..	Ossicles sparingly involved.			
		2. Dangerous Type.....	Perforation of varying size, situated marginally, involving annulus tympanicus; adhesive bands; polypi.	Bone necrosis, caries, eburnization. Otitis rarificans; petrosal pyramid involved. Bone lesions of tuberculosis or syphilis; osteomyelitis of temporal bone. Ossicles involved: true cholesteatoma.	Deafness, fetid otorrhea. History of exanthemata. Dizziness (late).	Acute mastoiditis, meningitis, labyrinthitis. Brain abscesses, etc.

THE CLASSIFICATION.

Division by Causative Factor.	Types and Names of Diseases.	Classification of Subdivisions and Subtypes.	Characteristic Otoscopic Finding.	Location of Characteristic Lesion.	Characteristic Symptoms.	Complication and Termination.
Middle and Internal Ear Diseases and Their Complicating Lesions.	Otosclerosis....	.....	Thickened or normal appearing drum. Deposits.	Spongification of labyrinthine capsule, ossitis rarificans. Ankylosis of stapes at foot plate.	Characteristic fork tests. Deafness, tinnitus, dizziness.	1 2
	III. General Conditions Constitutional Diseases. (Post-embryonal lesions, etc.)	1. Acute Acoustic Neuritis.... 2. Chronic Acoustic Neuritis.	Normal appearing drum.	Hemorrhage in labyrinth. Inflammation of perineurons or atrophy of nerve (auditory).	Deafness, tinnitus, dizziness. Poisoning from: Mineral poisons, drugs. Toxins. Occupation neuroses etc.	Neuritis of other nerves.

THE CLASSIFICATION.

Preliminary Observations Upon Pathologic Factors.—The subdivision of this classification into types of diseases is based upon an examination of numerous pathologic specimens, and upon a study of operative finding in lieu of autopsy examinations.

In cases of what were clinically simple attacks of purulent otitis media, an idea of the extent of the involvement was obtained through the use of radiograms to substantiate the findings of other observers.

Finally, many published case histories, which contained records of exact clinical and operative data, controlled by autopsy reports, were studied. The deductions drawn were made the basis of the subdivision into types to give a working classification.

It is conceded that many points regarding the pathology are still obscure, and for obvious reasons, therefore, these are insufficient to warrant final report. As future results justify it, detailed observations will be published either to substantiate or correct inaccuracies in the system of classification herewith submitted.

TYPES OF OTITIS MEDIA PURULENTA ACUTA.

The first type of this disease affects the new-born. The middle ear spaces contain, besides many embryonal structures subject to retrogressional changes and degeneration, amniotic fluid, which, acting as a foreign body, causes irritation, until infection supervening, a true inflammation results. It is limited to the first week of life. (Gompery, Aschoff.)

The other two types of otitis media purulenta are usually not differentiated one from the other. Yet a critical study of our clinical material will, I believe, justify this division.

We all have seen the two types. The one involving the mucous membrane alone, will usually present a perforation non-marginally situated, and located in the membrana tensa. Often the infection follows a "cold" or a previous catarrhal process in the affected ear. The middle ear and also the mastoid cells are filled with pus or mucopus (Politzer and Bezold), but the intercellular bony walls of the mastoid process are not destroyed.

Finally, such cases do not seem, from a study of their course,

to possess the elements tending toward chronicity and also the development of what we understand clinically as mastoiditis seems a less frequent sequel than in the next type to be discussed.

Boenninghaus tries to consider these cases as an empyema of the middle ear spaces, in the same sense as the collection of pus in the maxillary antrum, where the bony walls of the antrum are not diseased, is considered an empyema of the maxillary antrum.

Finally, this class of case in its milder form, is a borderline condition between the acute catarrhal processes and the acute otitic inflammations with bone lesions. This latter condition is the true acute otitis media purulenta. The disease often follows the exanthemata and influenza, and possesses many elements of chronicity from its very origin. The perforation may be seen in either the membrana flaccida or the membrana tensa, but when situated in the former, it makes the diagnosis of bone destruction in the aditus more probable. Finally, the perforation is generally marginal.

In conclusion, according to Politzer, Bezold, and others, substantiated by my work with radiograms, the mastoid process contains pus in both these types of cases, and one finds it hard to define where the otitis media ends and the mastoiditis begins.

This is especially true of the nonpainful type of mastoiditis, which is in this classification a borderline case between the clinically recognizable otitis medias and the classical mastoiditis.

The painless type of mastoiditis has received recognition from the studies into its pathology by Boenninghaus. Its characteristic symptom is the inordinately profuse discharge which gradually increases in amount as days pass.

I have seen such cases, where the pus simply flowed from the conchal opening, and because of absence of pain and constitutional symptom, I was loth to operate, yet the operative finding in the given case showed a great amount of bone tissue destroyed within the mastoid cortex, and, studied from the operating table, the decision to operate was amply justified. I have seen these cases among both children and adults, and while I cannot give more exact data to help in their diagnosis, at this writing, except the prolonged and profuse purulent discharge, which seems to increase in amount as the disease

runs its course, I believe the condition recognizable from this sign alone, and thus place it in the classification as a distinct type of acute mastoiditis.

The condition is often overlooked as a mastoiditis, until the cortex or inner table are perforated, and the symptoms from these sequelæ call attention to the disease.

The second type of mastoiditis in the classification embraces all the classical forms which are commonly recognized and grouped as acute mastoiditis.

Chronic otitis media purulenta, or chronic mastoiditis, is a general clinical term, grouped under which are numerous pathologic lesions having one symptom in common, namely, a purulent otorrhea. I have separated the cases presenting this finding into two types of diseases—those which in their course threaten intracranial complications, and those which run indefinite courses without the advent of such sequelæ. The one type I designate as "dangerous type," the other as "non-dangerous." I confess the division to be entirely arbitrary, but, once made, a study of both series of cases presented many interesting features. For example, the cases which upon the operating table demonstrated bone lesions were found to have almost invariably been the ones whose otoscopic examination gave a perforation or defect in the drumhead, which was situated marginally.

Again, when I studied my cases upon which I performed the radical mastoid operation, the successful results almost invariably were in those whose otoscopic picture gave the same general finding—a marginally situated perforation.

In studying cases which developed intracranial lesions, it is found that the majority of such occurred in cases with this otoscopic picture, and finally the literature of intracranial cases which makes full report of operative findings and clinical data, where mention is made at all of the kind and site of the perforation, gives a larger percentage of cases with marginally situated perforations. The conclusion I fain would draw from these premises is that the marginal perforation, in chronic otitis media purulenta, is pathognomonic of bone lesion, and from cases of this disease with bone lesions, caries, necrosis, etc., the results of the radical operation are in proportion to the thoroughness with which the lesion is removable surgically.

On the other hand, the cases whose otorrhea has gone on

uninterruptedly or intermittently for years without change or inconvenience to the patient, generally were found among those whose otoscopic picture gave a centrally located or nonmarginal perforation.

The failures in my radical mastoid surgery were likewise found among this group of cases; and in the majority of these cases with nonmarginal perforations the operative findings did not show marked bone lesions, but did show, as far as it was macroscopically demonstrable, changes in the mucous membrane and also showed distinct pathologic conditions in the rhinopharynx, and finally after operation, the secretions persisting, could often be traced to the tympanic orifice of the eustachian tube.

From these premises I conclude that the nonmarginal perforation is significant of a lesion in the pharynx or eustachian tube, and in the continuation of the mucous membrane lining of the middle ear cavities.

That nonmarginal perforation should signify the nondangerous and marginal ones, dangerous types of otitis media purulenta chronica, follows from the above, and is substantiated by observations of the clinical courses of both types of cases.

It is to be noted, however, that the imposition of an attack of acute mastoiditis upon the lesions presented in the nondangerous type of chronic otitis media purulenta may bring in the train of this secondary process—the mastoiditis—any complication which logically could follow as a sequel of acute mastoiditis.

It may be interesting to state that to many of these features of both these types of otitis media purulenta chronica, I have already called attention, having presented these findings to the American Laryngological, Rhinological and Otological Society in 1908 in a discussion upon Radical Mastoid Surgery, and then suggested, when discussing Dr. McKernon's paper, that the division into these two types would perhaps enable us to prognosticate the results of the radical mastoid operation with greater surety.

I again recalled these data before this section in a discussion of Dr. Barnhill's paper on the reasons for failures after the radical mastoid operation, and finally in the last edition of Dr. Ballenger's text book there is a review of the opinions of Leutert, Zaufal and others on the significance of the marginal

and nonmarginal perforation and the location of the perforation. The conclusions arrived at by Ballenger are not entirely similar to my observations, although he concludes his statement by expressing his opinion that a radical operation "upon a case with a perforation at this point (nonmarginal perforation over the tubotympanic orifice) would, in all probability, fail to check the otorrhea." (The parenthesis is mine.)

Concluding, attention is called to the classification, which, through the courtesy of Drs. Rae and Page, I was enabled to place in your hands some days ago.

This was done to evoke a full and free discussion of its merits and shortcomings, so that through the benefit of the discussion I might improve in this work which I have undertaken.

616 Madison Avenue.

XXI.

OBSTINATE STENOSIS OF THE LARYNX FOLLOWING DIPHTHERIA. REPORTS OF TWO CASES.

By D. J. GIBB WISHART, M. D.,

TORONTO.

Every laryngologist connected with a hospital for sick children will sooner or later come in contact with cases of this variety, but the two which I am about to relate present some unusual features, and are therefore of interest. The cases are as follows:

CASE 1.—F. S., female, aged 8 years. Contracted laryngeal diphtheria and entered Isolation Hospital on November 17th, 1907. Was intubated next day, and the tube removed on the 23d, again intubated on the 26th, and tube removed on December 2d, discharged cured December 24th. On January 27th the child contracted a cold, which was attended with marked dyspnea, and the laryngologist attached to the home of which she was an inmate, inserted an intubation tube, which was left in place for four days. The child entered my service in the Hospital for Sick Children on the 6th of February, 1908, and on admission the following conditions were present: Face cyanosed, breathing stertorous, pupils dilated, position of body that of opisthotonos, marked tracheal tugging, with epigastric indrawing, all the accessory muscles of respiration in energetic action, reflexes either sluggish or absent, tonsils and adenoids enlarged.

An ineffectual attempt was immediately made to introduce intubation tubes, sizes for two and four years being used, but as the patient became increasingly cyanosed, a little anesthetic was administered, the isthmus of the thyroid cut between artery forceps, and the trachea rapidly opened. As soon as respiration had been re-established, and the toilet of the wound attended to, the larynx was examined both from above and below, and the vocal chords were found to lie in close apposition, suggesting paralysis of the abductors. Forceps were

introduced from below and the chords separated, and an intubation tube, size eight years, introduced from below, then from above, and left in place. The edges of the tracheal wound were approximated with sutures, but no attempt was made to close the wound superficially, and the patient was placed in a tent bed with steam. The neck wound healed quickly, and the patient made very satisfactory progress until the twenty-sixth day, when the intubation tube was withdrawn, but within a few hours severe dyspnea again developed, and the tube was reinserted. This was coughed out a few hours after, but as the breathing continued easy, under the administration of an antispasmodic and a steam tent, it was left out. During the next fifteen days there was dyspnea, increased during sleep, but not sufficient to cause alarm. On March 18th (the 123d day) a croupy cough developed and violent dyspnea ensued, intubation was attempted unsuccessfully, and unconsciousness supervening, the trachea was again opened, with immediate relief. On the fourteenth day thereafter the tonsils and adenoids were removed, and this was followed by severe hemorrhage, but the patient progressed favorably during the month of April, and on the 5th of May (171st day) another attempt was made to intubate, three sizes of the tube being tried, but on account of spasm, insertion was impossible, and the tracheal tube was left in place. On the 21st an observation of the chords was obtained with the laryngoscope, and, as movements both of abduction and adduction were present, the nurse was instructed to plug the tracheotomy tube regularly, and the patient encouraged to use the larynx. On the 23d of June the condition of the larynx was verified by direct laryngoscopy (Killian), and the tracheal tube removed, but shortly an intubation tube was necessitated by the dyspnea, and although removed several times, it could not be finally left out until the 14th of July (231st day). On the 6th of August examination showed that the movement of the right vocal chord was distinctly weaker than that of the left. The power of phonation was good, but the voice was husky and the pitch could not be raised. General health good. Patient discharged on the 254th day.

During the whole treatment strychnin was administered regularly in doses varying up to the point of toleration, and other tonics as well.

* The patient did not appear again for about three months, during which interval her respirations were notably labored and the voice hoarse. On examination both chords were deficient in abductive power, and in deep inspiration almost assumed the cadaveric position. Strychnin was again ordered and the patient allowed to accompany her mother to England, where she was instructed to place herself under observation.

CASE 2.—E. C., aged 2½ years, female. The family attendant was not summoned until the child, a delicate youngster, had suffered from what was supposed to be croup, for over ten days, but from the marked laryngeal stenosis present, administered antitoxin immediately, although there were no pharyngeal symptoms. The stenosis increased, and I was called in, October 21st, 1908, in consultation within twenty-four hours, and at once intubated. Following the custom now taught in Vienna, I had the nurse withdraw the tube at the end of twenty-four hours, but was compelled to reinsert it six hours later. The child was now showing symptoms of bronchitis, to which it had been previously subject. This tube was left in place for three days, and again removed, but within six hours the dyspnea necessitated reinsertion. On each occasion when the tube was withdrawn the tracheal tugging was as marked as at first, but when the tube was worn there was no evidence of discomfort, and the temperature, pulse and respiration gradually quieted to normal. At the end of the third day thereafter (18th day of disease), the child having been perfectly comfortable all that time, the nurse pulled out the tube, but dyspnea at once became marked. I was immediately summoned, but as the patient lived at some considerable distance, it was two hours before I reached her, and by this time cyanosis was quite evident. The tube was inserted, but the patient stopped breathing immediately, and did not recommence on its withdrawal. Tracheotomy was hastily performed, the intubation retractor being inserted through the larynx into the trachea as a guide, and artificial respiration was ultimately successful in restoring animation, and although the temperature became elevated, the patient continued to improve. Swabs from the larynx had revealed the presence of Klebs-Loeffler bacilli. On the 41st day, after swabs had been declared free of germs, on account of respiratory difficulties, an examination was decided upon, under an anesthetic. On closing the

tracheotomy wound, dyspnea at once became manifest, and was not improved by the removal of a few granulations which were found on the tracheal wall. I decided to reintroduce an intubation tube, and allow the tracheal wound to close, as the patient was much stronger and had been declared free of diphtheria by the health department. The child was allowed out, convalescence progressed favorably, and on the 53d day the intubation tube was finally removed. Although the patient at first breathed fairly well, dyspnea gradually set in, and on the 55th day she entered hospital for an examination by direct laryngoscopy, when the rima glottidis was found extremely narrow, and the bands and vocal chords covered with a patchy white membrane. The trachea was then reopened and examined with the bronchoscope in both directions, but was found absolutely clear, while the appearances of the lower surfaces of the vocal chords was the same as when looked at from above. A portion of the membrane removed at the time of operation was found charged with Klebs-Loeffler bacilli. Antitoxin was again administered, and the child continued to progress most satisfactorily as to general health and conditions, but dyspnea was speedily produced by every attempt to plug the tracheotomy wound. A week ago (125th day), after swabs taken from the trachea had been again declared free of bacilli, I examined the child, but found that removal of the tracheotomy tube was impossible because of the laryngeal stenosis, and am since informed that bacilli were found on a swab which I took from the larynx at the time of the examination, so that diphtheria is still present, but it would appear that it must be of a very mild type, as thorough isolation has been impossible, and members of the family have come into contact with the child without apparent danger.

The conduct of this case has been rendered exceedingly difficult by the age and intractability of the child, and also by its intolerance to anesthesia, which have rendered examinations of, or applications to the larynx practically impossible.

In case No. 1, the cause of stenosis was undoubtedly due to weakness of the abductors, which resisted all the usual treatments for laryngeal paralysis, and the ultimate prognosis is, in my opinion, poor, on account of the long period during which the paralysis has been noted. In Case No. 2 I have not been able to satisfy myself that paralysis is present, but

have only been able to obtain a view of the chords on one occasion, namely, when I had it in hospital. At that time the swelling of the parts and the presence of membrane would sufficiently explain the narrowing of the glottis. Now I am at a loss how to secure the healing of the larynx, and until the diphtheria disappears the further treatment to be adopted cannot be outlined. Laryngotomy might offer relief, but even Sargnon and Barlatier, as reported in the *Journal of Laryngology*, give six months as the shortest possible time required to effect a cure, and the road to be traveled presents great difficulties.

During the month following the above notes of Case No. 2 I applied nitrate of silver directly to the larynx, and treated a few granulations that appeared in the trachea, and attempted unsuccessfully on various occasions to substitute a shortened form of tube in the tracheal opening, but it was not till May 25th (227th day) that I succeeded in replacing the tracheotomy canula by a Killian perforated hard rubber plug reaching just to the outer tracheal wall. This was retained for some time, and meanwhile the attending physician, Dr. Ida Lynd, injected fibrolysin at regular intervals. The child passed through the summer uneventfully, except that tracheal tugging was still perceptible, and the onset of any slight cold caused difficulty of breathing. Early in September the difficulty of breathing became more marked, and on the 15th I examined the larynx by direct laryngoscopy under an anesthetic. The larynx was found markedly stenosed, and my smallest Killian tube would not penetrate. I then attempted to insert the smallest intubation tube, and after some effort passed it between the cords, and left it in place for some minutes, and then inserted the tube corresponding to her age, but with a decided difficulty. The child left my office breathing fairly comfortably, and continued to do so for fourteen hours, when some stenosis and great depression set in. I was not notified for two hours, and when I reached the child it was obvious that reopening the trachea was the only procedure likely to be of benefit. The heart was evidently quite unequal to its task, the patient being pallid, but not cyanosed. The father refused any operative interference, and the child quickly succumbed. Here ended a struggle protracted over eleven months, when victory was in sight.

47 Grosvenor Street.

new wood

XXII.

LABORATORY METHODS AS AIDS IN DIAGNOSIS
OF NOSE, THROAT AND EAR AFFECTIONS.*

By JOSEPH C. BECK, M. D.,

CHICAGO.

The laboratory is growing in influence in the diagnoses and treatment of disease in practically the entire domain of medicine. Our department has not been entirely lacking in this respect. Nevertheless, it must be admitted that the great mass of specialists have not given this valuable aid the attention that it deserves. It is for this reason that I bring this subject before you in order to stimulate those who can see with me the importance of laboratory methods; and to show how everyone may take advantage of a practical working system in order to obtain better results. All men who have been graduated from college since the laboratories were made an important part of the teaching curriculum may become qualified laboratorians, and all that is required is sufficient interest and time. The technic, while important to understand, need not necessarily be carried out by the clinician himself. In fact, it is almost imperative that he have the technician with whom he co-operates in what is known as "team-work." This team-work is of benefit to the clinician, technician and the patient as well, and I can state without question that this method is far more satisfactory than where the clinician does the entire work himself. It has been customary for one to take a specimen of tissue, blood, etc., to refer it to the laboratory and to receive a written report of the technician's or pathologist's findings. Of course, there is considerable information to be gained from such a report, but the confirmation by one's own examination of the slide, culture, etc., gives so much additional assurance and in-

*Read before the Middle Section of the American Laryngological, Rhinological and Otological Society, Detroit, February 22, 1910.

terest that it makes the work more satisfactory to everyone concerned.

I divide my laboratory work into seven departments, as,

1. Hematologic and serologic.
2. Bacteriologic.
3. Pathologic.
4. Chemical and analytic.
5. Radiologic.
6. Photographic and illustrative.
7. Experimental.

I shall attempt to demonstrate from some of them certain results, not desiring to discuss the various subjects presented, since they serve only as examples. This material is, however, out of my own practice.

1. Hematologic and Serologic.

- (a) Blood counts in septic sinus thromboses as to leukocytosis.
- (b) Blood cultures in the same condition.
- (c) Cerebrospinal fluid examination in meningitis.
- (d) Coagulation test in bleeders.
- (e) Hemoglobin test in anemia.
- (f) Blood counts as to red cells in anemia.
- (g) Wassermann's and Nogouchi tests in syphilis.
- (h) Blood of a malaria (Lavaran's) organism.

2. Bacteriologic.

Cultures and Smears of,

- (a) *Staphylococcus albus*, *aureus* and *citreus*.
- (b) *Streptococcus*.
- (c) *Pneumococcus*.
- (d) *Bacillus influenzae*.
- (e) *Bacillus diphtheriae*.
- (f) *Bacillus pyocyaneus*.
- (g) *Bacillus typhosus*.
- (h) *Bacillus tuberculosis*.
- (i) *Bacillus rhinoscleroma*.
- (j) Ray fungus of actinomycosis (smears only).
- (k) *Spirocheta pallida* (Dunkel Kamener).

3. Opsonic Index Determination.

4. Pathologic.

(a) Gross specimens.

Tonsils and adenoids of children (two varieties).

Tonsils of adults (two varieties).

(1) Middle turbinated body; (2) with nasal polypi, and
(3) ethmoid curettements.

Inferior turbinated (two varieties).

Septum (three varieties).

Larynx, tubercular, syphilitic, carcinomatous.

Goitre (three varieties).

Glands of neck, tubercular.

Ossicles of ear (removed during radical operation).

Mastoid chips.

Cholesteatoma masses.

(b) Microscopic specimens.

Tonsils (two varieties).

Adenoids (two varieties).

Middle turbinated body (two varieties).

Nasal polypi (three varieties).

Ethmoid cell (one variety).

Inferior turbinate (two varieties).

Septum (two varieties).

Neoplasm of tonsils: Sarcoma, carcinoma, endothelioma.

Carcinoma of larynx, epithelioma of the external ear.

(c) Microscopic specimens.

Goitre (two varieties).

Glands of neck (two varieties).

Ossicles (two varieties).

Mastoid chips (six varieties).

Cholesteatoma.

New-formed epithelium after radical mastoid operation.

Keloid scar treated with fibrolysin injection.

5. Chemic and Analytic.

(a) Secretion: Saliva, tears, cerebrospinal fluid, gastric.

(b) Excretions: Urine, feces.

(c) Discharges: Pus and mucus from nose, throat and ear,
or externally about the mastoid, face and neck.

6. Radiologic.

An atlas containing descriptive matter as to the technic of radiography and interpretation of twenty-six typical pictures of nasal accessory sinuses of the nose and mastoid region; special attention is paid to the stereoscopic radiography and is further illustrated by a number of stereos. The purpose of this atlas is to enable any oto-rhino-laryngologist to have a radiologist take a picture of the sinuses or mastoid correctly, and be able to interpret the plate in connection with his other clinical manifestations himself. The interpreters accompanying each plate are of the utmost value to the one not accustomed to the interpretation of radiograms, and this idea has been adopted from Killian's Atlas of the Accessory Sinuses.

7. Photographic and Illustrative.

Stereoscopic photographs of cases.

- (a) Electric burn (live wire) of alæ of nose and face.
- (b) Tubercular osteoperiostitis of zygoma and external auditory canal.
- (c) Carcinoma of superior maxilla, postoperative.
- (d) Congenital lap ear (yellow kid).
- (e) Luetic destruction of nose (external deformity).

Stereoscopic colored photograph (Lumiere's process) of cases.

- (a) Congenital lues (external nasal deformity).
- (b) Lupus vulgaris (external portion of nose and cheeks).
- (c) Head dissection (injected with colors).
- (d) Neck dissection (injected with colors).
- (e) Dissected tonsils.
- (f) Septum nasi.
- (g) Tonsil tubercular.
- (h) Nasal polypi.
- (i) Middle and inferior turbinated bodies.

Illustrations in pen and ink, wash, oil of macro- and microscopic specimens, operations, etc.

This photographic and illustrative department of the laboratory is one of the most instructive and interesting parts. In keeping a record of cases it completes the same to a nicety. In having an artist in the laboratory it facilitates matters a great deal.

8. Experimental.

In connection with every well-equipped laboratory there must be some animals for experiments. Outside of the general laboratory is a place where a number of cages are situated with guinea pigs. These require good attention in order to exclude possible error when inoculating them.

I am satisfied that I have presented nothing new, but am sure that the time given to the consideration of a practical solution of the problem of laboratory work will not be amiss. Most laryngologists and otologists are connected with institutions that have laboratory facilities with good technicians, so that they can study their specimens, etc., in a very satisfactory manner. The preservation of pathologic structures removed from the nose, throat and ear, of which material there is so much, makes an excellent museum, and serves as good teaching material in the pathology of our specialty. It is about time that the waste jar should be deprived of this rich material. If one has not the hospital laboratory facilities, then one can with very little expense have his own private laboratory in connection with his office or operating room.

I know a number of men in other branches of medicine who employ a young girl to carry out the technic of the most important branches of the laboratory, as bacteriology, pathology and analyses, with satisfaction, and if one has an assistant, this is of easy execution.

In conclusion, I wish to express my regrets that the medical profession of this country is denied one of the most important parts of laboratory work, namely, postmortem examinations. Our foreign brethren, to whom this obstacle is unknown, have the tremendous advantage over us in the study of the pathology, and I hope the day is not far distant when we may be able to post our cases, at least in the large cities, in the public hospitals. These postmortems, that are made in our hospitals, are performed by the general pathologist, who, as a rule, is not competent to make a satisfactory examination of the special organs, and consequently the results are very unsatisfactory. It seems to me that when a case is posted where the nose, throat and ear and their adnexa are the chief factors in the causation of death, there a specialist should be the one to make the autopsy, at least of the head.

XXIII.

ATRESIA OF THE EXTERNAL AUDITORY CANAL.

By EDGAR A. FORSYTH, M. D.,

BUFFALO.

Closure of the external canal may be congenital or acquired. It is not a common condition. In looking over the literature on otology I find very little pertaining to this subject. Some of our authors make no reference to it. Bishops says records of Illinois Charitable Eye and Ear Infirmary at Chicago show only three cases of congenital absence of meatus out of 21,000 cases. Congenital atresia is usually associated with malformation of the auricle, and in most cases with malformation of the middle and internal ear from imperfect development. This internal malformation renders surgical interference inadvisable except in the simplest form, where the closure is merely by a thin layer of skin. This is a rare condition, as atresia is almost always bony, and may be so complete that no sign of the entrance into the external meatus exists. The point of occlusion is most always situated at the junction of the cartilaginous and bony portion of the auditory canal. The acquired form is of rare occurrence and is the result of chronic suppuration of the middle ear, extensive ulceration, operations, over-use of cauterizing agents, or caries and necrosis of the external meatus, phlegmonous, periauricular inflammation extending into the auditory canal. Cases have been reported following radical mastoid. Care must be exercised not to tear the membranous auditory canal from its bony attachments in this operation, as it may cause atresia of the auditory canal.

Reports of complete acquired closure of the meatus are more rare than those of congenital absence of the meatus.

It is well known that with bilateral atresia hearing and understanding of speech can exist. Two such cases are reported.

The occlusion may be skin, cartilage, bone or a combination of these elements, and the occlusion may be partial or complete.

In cases of osseous occlusion it is never complete, as careful search will usually reveal a channel through which a fine probe can be passed.

The condition is discovered when the patient seeks relief from deafness or a chronic suppurative otitis media. They usually give history of middle ear suppuration that has ceased to discharge and followed by deafness, or ear may be discharging when they seek relief. There may be pain in or about the ear, commonly in front of the tragus, or there may be frequent attacks of earache. In some cases pus seeks an outlet through mastoid. When the atresia is due to obstruction near the external orifice there may be a shallow depression to indicate the site of meatus.

The canal appears as a pale gray or grayish-red glistening cul-de-sac. The further the atresia extends externally, the shorter appears the auditory canal. When the atresia is located at the innermost part of the osseous meatus the surface of the growth may be taken for the membrana tympani. In such cases the poorly defined margin of the growth, the absence of the short process and handle of the malleus, and the shorter distance between the deeper parts and the external auditory orifice, as compared with the other side, will establish the diagnosis. By use of the probe we can ascertain whether we are dealing with a membranous, connective-tissue or osseous growth. Information regarding the thickness of the atresia is sometimes afforded through the test for hearing. In an osseous or extensive connective tissue atresia we usually find absolute deafness or a disturbance of hearing of a high degree, often accompanied with tinnitus. In membranous atresia the hearing distance for speech may be considerable. A hearing trumpet should be used in testing the hearing, as loud speech is partly transmitted through the cranial bones. In osseous and connective tissue atresia the words spoken through the trumpet will be understood with difficulty, or not at all, but if the atresia is a thin membrane, soft, low speech can be well understood, providing the middle ear and labyrinth have not undergone any great change. In those cases in which whispered speech is heard through the hearing trumpet it is quite probable that the atresia is very thin. In such cases operation is likely to do some good. On the other hand, those cases that do not hear with the aid of the hearing trumpet are not very likely to

be improved by an operation. Operative procedure gives better results in acquired than in congenital form. No operation should be undertaken to correct maldevelopment of the canal unless the middle and the internal ear are found to be intact.

Schwartz holds that invariably where grave one-sided atresia is present a maldeveloped labyrinth also exists on the affected side, and substantiates his observations by the fact that a test fork placed on the middle or the top of the head is heard only in the normal ear. When bony atresia is demonstrated to be present, surgery should be resorted to only after proving by fork test that middle and internal ears are intact. Congenital atresia involving the bone where the functioning apparatus is involved, give poor results, and operation same as simple mastoid is performed, keeping the postauricular wound open to permit sound waves to reach the middle ear through the opening may afford relief, according to Michael Jaeger. In cases of fibrous or membranous character operation by intrameatal method is indicated. In suppurative cases best results would be obtained by doing a radical mastoid operation.

I have seen one case. On August 31, 1908, Mrs. C. L., age 30, came to the Emergency Hospital Dispensary, with history of discharge from right ear since she was teething, never had any pain, but at times discharges blood and pus profusely, some pus at all times. Speculum was not needed to examine ear, as canal was closed near external opening. It looked as if closure was complete, but a small probe could be inserted into a small slit in the lower part, near the floor. End of probe came in contact with bone as soon as introduced. Its removal was followed by pus and blood. She also had a large goitre. I saw no more of her. I tried to find her later, and, on making some inquiries, found she had been operated on for her goitre and one-half was removed. She became delirious and died in a few days.

This was a case for radical operation. It was my intention of doing one on her, but I never saw her but once. With a history of chronic suppurative otitis media of nearly thirty years' duration, and as there was no malformation of external ear, I believe this to be a case of acquired atresia due to chronic suppurative otitis media and one in which operation would have been required.

322 Franklin Street.

XXIV.

REMARKS ON THE X-RAY TECHNIC IN THE TREATMENT OF LARYNGEAL PAPILLOMATA IN CHILDREN.*

By A. L. GRAY, M. D.,

RICHMOND.

Fully appreciating the fact that for an agent to be termed a remedy it must be applied with benefit in a considerable number of cases of a certain malady, I present to you two instances in which there has been a marked change for the better following promptly upon the application of the Roentgen rays to laryngeal papillomata after other measures had failed. I leave for the future to decide whether or not we have in this a remedy for this distressing condition.

With the knowledge that the Roentgen rays properly applied manifest a destructive effect upon atypical cells, preventing their proliferation and producing a retrograde metamorphosis, I determined to apply them with the hope that some such effect might be wrought on these vegetations within the larynx.

CASE 1.—(Reported by Dr. Dunn.) On July 6, 1906, Sarah C., white, age 3 years, 2½ months, residing in a distant state, was referred to me by Dr. John Dunn, of this city. Family and personal history, excellent. Three months after birth hoarseness began. This persisted in spite of all efforts to relieve her "bad cold," until the first week in July, 1905, when her respiration became so obstructed that she was brought to this city on July 11th, and a tracheotomy was performed by Dr. Dunn one hour after her arrival. The following winter after a "cold" she again presented evidences of obstruction to her respiration, with the tracheotomy tube in situ. This con-

*Read by invitation at a meeting of the American Laryngological, Rhinological and Otological Society, Southern Section, Richmond, Va., February 12-13, 1909.

tinued without improvement until July, 1906, when she was again brought to this city, and received her first X-ray treatment on July 6th, of that year.

My intention was to give her daily treatments on alternate sides until she should approach the reaction, limit, but bad weather, and some intercurrent intestinal disorder prevented the strict execution of my plan.

Treatments were given with a static machine giving a half to three-fourths milliamperes in the tube circuit, with the tube backing a parallel spark gap of four to five inches (about Walter 5). The rays were directed through a lead glass protecting shield, to each lateral aspect of the neck at a point corresponding with the larynx, the child being seated in her mother's lap. Each application was of ten minutes' duration, target ten inches from the skin. She received thirteen treatments within a period of twenty-five days.

In June, 1907, she again returned, this time much improved. Nine treatments were given in nine days, alternating the sides.

On November 3, 1907, she began her third series, and received eleven treatments in nineteen days. At the expiration of this series the base of a single papilloma, that had been present when the series was begun, had disappeared entirely.

The tracheotomy tube was permanently removed by Dr. Dunn July 21, 1908.

A letter from her mother, dated January 26, 1909, reports the child as "fine, can talk as loud as anyone would have her," although the tracheotomy wound has not entirely closed.

CASE 2.—J. McL., white, male, age 6 years. Referred by Dr. John Dunn, July 30, 1908. Diagnosis, laryngeal papillomata. Tracheotomy performed two years previously by Dr. Dunn. Condition of his larynx, same as when operated on.

Treatments were begun July 30, 1908, using twenty-four inch induction coil, tube reading Walter 5, three-fourths milliamperes in tube circuit, five minutes, at fifteen inches, mercury interrupter. Applications daily, treating alternating sides. Eight exposures were given in eight days.

Improvement began after five treatments. His parents were instructed to bring him back to me in six weeks, but owing to illness in the family, he has not been returned for a second series. His father promises to have him here during the present month.

A letter from his physician, dated January 21, 1909, states that "his improvement has reached a point where he can now breathe through the pharynx fairly well with the tracheotomy tube removed and the opening closed with the finger. I doubt whether it would be safe yet to leave the tube out permanently, as there is still some obstruction to his respiration."

Owing to the distance of residence, and the obstacles presented thereby, neither of these cases was watched as carefully as desired, thus accounting for the apparent lack of definite system in the reports of these cases.

In the treatment of malignant neoplasms beyond the skin, the roentgenologist has to encounter the serious obstacle of the absorption by the skin of the rays that are so efficient in superficial cancers; hence the failure to obtain good results in the deeper growths. Marked effects, however, are produced on other cells in the deeper organs of the body. The radiations from the Crooke's tube are not homogeneous; one kind is absorbed by the skin, another penetrates. It is possible that the penetrating rays are those which exert the influence, if there is any, on the papillomatous formations.

312 E. Franklin Street.

XXV.

REMOVAL OF A RHINESTONE FROM THE MIDDLE
EAR OF A CHILD. EXHIBITION OF SPECIMEN.*

By CLEMENT F. THEISEN, M. D.,

ALBANY.

Early in May, 1908, a boy five years old was brought to my office with the following history: About six weeks previously, while playing with some children, he inserted a rhinestone, which had been taken out of a cheap ring, into the left ear, and in attempting to remove it pushed it further into the canal.

The boy lives in another city and was taken to the family physician, who could see the stone, but could not get hold of it. Another physician (not a specialist) was called, the boy was given an anesthetic and, according to the father's story, for two hours attempts were made to remove the stone from the ear, but without success. This operation was followed by a profuse bloody discharge, which later became purulent, and then in about ten days stopped spontaneously. I did not see the boy for over a month after the attempts at removal, and then there had been no discharge for about two weeks, but the boy could hear very little on that side.

On examination I found that the left tympanic membrane had been practically destroyed, and all I could see was a mass of granulation tissue.

On examining with a probe I could feel a distinct resistance through this, and on tapping very gently could hear a click, showing that the foreign body was there.

The boy was sent to St. Peter's Hospital, put under ether, and the granulations carefully curetted away. This was followed by a fairly profuse hemorrhage, which could be readily controlled with adrenalin, and the rhinestone could then be plainly seen in the middle ear.

*Read at the meeting of the Eastern Section of the American Laryngological, Rhinological and Otological Society at Watertown, N. Y., January 15, 1910.

I tried to remove it through the meatus, but could not get back of it, and the instruments constantly slipped off.

A posterior incision was then made, part of the posterior bony canal wall removed, and then, after several attempts, a ring curette could be inserted back of the stone, and it was removed.

There was a discharge from the ear for several weeks, and later, as a result of the first attempts to remove the stone, a stricture of the external meatus developed, which had to be corrected by a secondary operation.

The boy is now in good condition. Hearing not quite as good as with the other ear, but the calibre of the external canal is nearly as large as that of the right ear.

XXVI.

THROMBOSIS OF THE JUGULAR BULB WITHOUT
APPARENT INVOLVEMENT OF THE LAT-
ERAL SINUS; UNUSUAL BLOOD COUNT;
METASTASIS; PARALYSIS OF
EXTERNAL RECTUS OCULI.

BY JOHN R. PAGE, M. D.,

NEW YORK.

The complications which occurred in this case of acute mastoiditis are, I think, sufficiently interesting to warrant my reporting them. She had a thrombosis of the jugular bulb without any apparent involvement of the lateral sinus, and later a paralysis of the external rectus of her right eye and a metastasis in her forearm. Her blood examination, two days after the mastoid operation, when she was in good condition except for her high temperature, showed almost a leucopenia, and not until her jugular was excised three days later did the leucocytes number over 10,000.

I regret that I was unable to obtain a blood culture when the symptoms of thrombosis first developed, and that no examination of the jugular vein was made by a pathologist after it was removed.

The patient, a young woman of 20, unusually strong, and well nourished, with no history of previous disease worth mentioning, complained of an earache of three days' duration. Examination showed in the right ear a bulging drum, small perforation, slight discharge and slight tenderness over the mastoid antrum, temperature 99. After a myringotomy, which was refused until the following day, her temperature went to 104. The next day, the fifth after the onset, the mastoid was opened and found well involved, though not in an advanced stage of suppuration. The bone was very cellular, and the inner plate thin and hard. The bone was cracked over the sinus knee and removed for nearly a half inch, disclosing a

perfectly normal looking thin-walled sinus. The operation was completed and no further trouble anticipated. That night her temperature went to 104.4 and the next night to 104.8, with a variation during the day of two degrees. The dressing was removed, and, finding no infection of the skin or wound, exploration of the sinus was considered, in spite of its normal appearance. Just at this time, however, the report of a blood examination by Dr. Zabriskie came, showing only 6500 leucocytes and 63 per cent polynuclear neutrophils. The patient presented no appearance of sepsis and her general condition was excellent, tongue and mucous membranes moist in spite of the high temperature. A careful physical examination by Dr. Wilcox revealed evidence of slight constipation only. Blood was sent for a Widal examination, and a negative report was returned. Urine showed a positive diazo reaction. Her temperature the following night was 105. The next morning, Dr. Zabriskie being away, Dr. Scruton, of the House Staff, examined her blood and reported 9700 leucocytes and 84 per cent polynuclears. The patient still had no appearance of septic poisoning, pulse was around 100 and not above 110 with the highest temperature, no chills nor chilly sensations. At midnight temperature went to 105.2, and next day, the fifth after the mastoid operation, exploration of the sinus was decided upon. A blood count on this day by Dr. Huvelle of the House Staff showed 9100 leucocytes and 81 per cent polynuclears. The sinus was uncovered from a point one inch behind the knee to the horizontal turn toward the bulb, and its external appearance, except where it had been exposed at the previous operation, was perfectly normal. It was compressed above and below, and opened with a pair of small scissors, one blade in the lumen of the vein, from above downward, almost throughout its whole exposure. A good view was obtained of its interior; no clot was discovered, and its internal walls appeared white and glistening. A free flow of blood followed relief of pressure above, but there was little or no flow from below. The jugular was then ligated in the lower part of the neck and lifted out of its bed. The glands along its sheath were somewhat enlarged in the upper part, but the walls were thin and the vein filled well. After its ligation above the facial vein, however, it failed to fill. It was removed filled with blood and put aside for examination, but through a nurse's

mistake was lost. After excision of the internal jugular a curette was passed into the lumen of the sinus toward the bulb, but no increase in the flow of blood was obtained from this direction, nor was any clot demonstrated. Her condition became considerably weakened after the jugular operation, and her appearance was decidedly septic, a severe chill occurring on the second day, followed by vacillations in temperature between 105 and 103 for three days, when it began to fall gradually.

On the second day after the operation paralysis of the external rectus of the right eye developed, and an abscess appeared in the left forearm, from which two or more drachms of pus were evacuated a few days later. Blood examination by Dr. Hoobler the day after the jugular was excised showed 18,000 leucocytes and 87 per cent polynuclears, and blood culture was negative. If the blood report with the low leucocyte count and polynuclear percentage had not been presented, the sinus would have been explored and the jugular in all probability excised on the second day after the mastoid operation instead of the fifth, but the low leucocyte count suggested beginning typhoid rather than beginning sepsis, and the exploration of the sinus was postponed, I think unjustifiably, because of it. In the case of sinus thrombosis with typhoid symptoms that Dr. Phillips reported, the blood count seemed to be of diagnostic value; in this case it was decidedly misleading.

The paralysis of the external rectus muscle is interesting when the relation of the sixth nerve to the inferior petrosal and cavernous sinuses is considered. This paralysis was almost complete at first, but is now hardly evident. It is remarkable that the nerves that pass through the jugular foramen in such close relation to the vein are rarely if ever affected in these cases. I was reminded of this close relation in another case, when after having excised the jugular, I passed a bent curette down into the bulb and several times got a marked jerk of the shoulder from irritation of the spinal accessory nerve. There was no evidence of any irritation of the vagus.

XXVII.

THROMBOSIS OF THE LATERAL SINUS; WHEN
TO OPERATE; WHAT TYPE OF OPERATION
TO CHOOSE.

By E. A. CROCKETT, M. D.,

BOSTON.

This paper has to deal with a subject which has been discussed more or less elaborately at many medical meetings, and certainly there have been enough individual case reports to bring the symptomatology well before all practitioners of otology, but this paper may be timely in that there is a wide difference of opinion as to when we should operate, after we are aware that there is a thrombosis of the lateral sinus and perhaps other sinuses or the jugular, and there is a particularly wide variation as to the nature of the operation which we should do. With a view to this latter question, I have gone over all the cases of operation upon the lateral sinus at the Massachusetts Charitable Eye and Ear Infirmary since 1905, that is, for the past five years. The statistics are drawn from the case histories of sixty operations by six different operators, and it is interesting at the onset to observe that there is apparently no difference of opinion among the surgeons and assistant surgeons at the hospital, either as to the type of operation which should be performed or the time at which it should be done. As you will see, all of our men are apparently agreed that as soon as the diagnosis is made the operation should be performed, and, personally, I think it is far better to do an early unnecessary operation than to allow the case to go too long and come to a fatal result, which could probably have been avoided by an early operation.

As far as possible, therefore, it would seem that all of these cases were operated upon in the early stage of the disease, some even before the thrombus was organized, but where the clinical signs pointed unmistakably to the formation of a parietal clot. Perhaps it is well for me to emphasize now these

symptoms, and in so doing I must, of course, mostly speak of the symptoms which influence me to operate, as I cannot speak for my colleagues in this respect. I should suspect the formation of a thrombosis in the lateral sinus in all cases of ear disease where there is a rapid elevation, with equally rapid remission of temperature, without the presence of cerebral symptoms. This rapid elevation and remission of temperature is to my mind of very great importance, and unless a three or four hour chart is kept it will be oftentimes impossible to detect its existence. With this elevation of temperature in adults there will usually be chilly sensations or actual chills at the period of elevation, and these may be as often as two or three times in the course of twenty-four hours. This, to my mind, is the most frequent and most diagnostic single symptom, and I have seen only two cases where a lateral sinus thrombosis has existed without such elevation of temperature. As accessory symptoms great stress should be laid upon increased leucocytosis and especially on a high white count with a high polymorphonuclear percentage.

In my service at the Massachusetts Charitable Eye and Ear Infirmary for a number of years it has been the custom to take a white count as a routine procedure as soon as the patient enters the hospital. If in such cases, coincident with elevation of temperature, the white count is found to rise steadily it is a far more certain evidence of sinus disease than a single count showing a high percentage. As far as my experience goes, although not an expert on blood counting, a very high white count is not usually obtained in otitic septiemia, and in the majority of cases here reported the count has not been over twenty thousand whites. This of itself is of some importance in considering the question of differentiation of meningitis, in which the count is usually thirty, forty or fifty thousand whites. Again, in my experience, an optic neuritis, either unilateral or bilateral, is a not uncommon early symptom in lateral sinus thrombosis, and is comparatively uncommon in acute cerebral infections in very early stages. In these sixty cases optic neuritis was observed in fifteen. Optic neuritis has also been observed in this disease by Kipp, Jansen, Lermoyez and Gruening.

Of course the diagnosis becomes easy when typical symptoms exist in cases where a mastoid operation has previously

been performed and where at this operation the sinus has been opened accidentally, or there has been found a perisinus abscess. Here, of course, the route of infection is at once evident. In regard to the first accident, namely, accidental opening of the sinus during operation, in nearly all of the cases I have observed for the last twenty years, a purulent thrombosis of the sinus has resulted, necessitating operation. I therefore regard this as much more serious than it is commonly supposed to be.

The observation of all my own cases where the lateral sinus has been accidentally opened prior to the time when we performed ligation of the jugular is interesting as showing the great diminution in the mortality resulting from stopping the natural drainage canal of the jugular vein. Prior to the operation of ligation, I remember four deaths in my own cases from general septicemia following accidental opening of the vessel, and since ligation, while I have seen a number of undoubted operative infections, all have speedily recovered after early ligation of the jugular.

It is also an interesting fact that the majority of the cases reported to-night were secondary to acute infection of the middle ear. This, I am sure, is quite contrary to my experience in the first ten years of practice where, although I have not the exact statistics, the vast majority of cases were secondary to chronic suppuration of the middle ear. There are two reasons for this: First, the infections of the middle ear and mastoid latterly are far more severe than formerly, and second, we do not see in the clinic as many cases of neglected chronic middle ear suppurations as fifteen years ago, owing to the fact that the general public and general practitioner are both aware of the importance of treating otitic suppuration.

Now, taking the cases I have reported to-night, I put myself emphatically on record in saying that we should operate with a view of relieving the thrombus in all cases of acute or chronic otitic suppuration presenting rapid elevation and remission of temperature for more than three days, especially with chilly sensations or chills, headache, vomiting, general malaise and increasing leucocytosis, without waiting for the undoubted symptoms of otitic septicemia, characterizing the latter stage of thrombosis with formation of metastases. I would make this advice particularly emphatic in cases where a former

operation has resulted in an accidental opening of the sinus or revealed the existence of a perisinus abscess, and subsequently such symptoms are exhibited.

Having decided to operate, then comes the question of what type of operation we should perform. Here there is a large difference of opinion revealed in the monographs of the various surgeons who have reported such operations in the last ten years.

We may confine ourselves to relieving the original source of the trouble in the middle ear or mastoid, making only an exploratory opening in the sinus, and if in such a case thrombus is found, removing the soft portion of such thrombus only. This is the oldest type of operation, and I suspect the most frequent at the present day.

Second, after performing the regular mastoid operation we may explore the lateral sinus and, having found a thrombus, then tie the internal jugular as low as possible and resect all the thrombosed portion of the vein, which in many cases may extend from the lower portion of the neck to the jugular bulb.

Third, we may in addition to the mastoid portion of the operation, tie off the internal jugular below the point of thrombosis and bring the upper portion of the vein out of the neck wound and use it as a natural drainage tube. It may in certain cases be flushed out, where a softened purulent thrombus exists.

Fourth, we may simply ligate the jugular without resection or without bringing the upper end out of the neck wound, which is, of course, the simplest and shortest operation and the one, in my experience, most successful in a large variety of cases.

If we follow the last operative procedure, shall we open the sinus above, before ligating the jugular, or shall we ligate first and open above last?

I shall at once dismiss the first operative procedure, namely, simply opening the lateral sinus and removing as much of the thrombus as possible, as an unsurgical procedure. In doing this I am, of course, really consulting only my own surgical predilections. This was the operation performed by all of us in the beginning, and the best I can say about it is that it is more satisfactory than not opening the sinus at all. It reduced the mortality rate ten and fifteen per cent in a large

series of statistics, but it should be remembered that about fifty per cent of the cases of lateral sinus thrombosis recovered eventually without operation. It shortens the duration of the septicemia considerably—still the patient is sick a long time. It does not relieve the danger of metastasis, which is certainly the point of greatest danger in this disease, and, in fact, an extensive curetting of the thrombus may actually cause a metastasis where one has not existed before. I have seen this occur two or three times.

Second, should we resect the whole thrombosed portion of the vein? This operative procedure I have never performed myself, and I think it has only been performed once at the Massachusetts Eye and Ear Infirmary, at least I found only one record of this operation in carefully searching the records for the past six years. It is undoubtedly a proper surgical procedure, except that it is too radical. It is a long and difficult operation, leaves the patient with a large scar on the neck, requires a great deal of surgical experience on the part of the operator and, in my opinion, subjects the patient to an unnecessary amount of surgical shock.

This expression of opinion will doubtless create an argument at this meeting, as I intend it to. All I can say is that by the simple procedure followed at the Massachusetts Charitable Eye and Ear Infirmary the death rate seems to me very materially lower than that following any other operative procedure I have seen reported, which fact, if true, certainly justifies the simple operation.

Whether the jugular should be simply ligated and the ligated end allowed to drop back into the wound or the ligated upper end brought out is the next point at issue. For several years I brought the end out and used it for a drainage tube, the method now used by Alexander and by Politzer's clinic generally. At the present time I allow the operated end to drop back into the wound and put a gauze drain down through the deep cervical fascia, allowing the vein to rupture spontaneously above the ligature, and discharge from the neck. Such discharge, as a rule, lasts only three days to a week, and is accompanied by only a slight disturbance and does not affect the ultimate healing of the wound. By either of these methods a very simple scar is made, so small as to be hardly noticeable in two or three years after the operation. I have a number of

times had difficulty in finding it in operated cases where the original incision had been made with some consideration of the ultimate cosmetic effect.

This operation of simply ligating below the lower end of the thrombus or, in any event, through the firm portion of the thrombus, can be done very rapidly, with very little shock to the patient, through a very small incision, and has certainly been adopted upon by the different members of the staff at the Massachusetts Charitable Eye and Ear Infirmary. I found in searching the records over at the hospital in the last five years that this operation had been performed, without variation, in every case of lateral sinus thrombosis in the hospital, irrespective of whether the disease was of long or short duration, and whether the thrombus was purulent or otherwise, or whether metastases did or did not exist.

The death rate in these cases was 16 per cent.

These statistics, it seems to me, justify the simple operation, and, in fact, make its mortality rate far better than that of any other type of operation of which I have any knowledge, especially when you consider the fact that these are all hospital cases, none in private practice, consequently many of them patients of low resistance and where the disease has run a long course prior to operation. Many of them were in a critical condition at time of operation. Simplicity of operation is certainly a thing much to be desired, as is also rapidity.

I have had three cases, two in the hospital and one in private practice, where the patient was so desperately sick at the time of operation, that it was a question whether he would survive etherization or not, consequently rapidity of operation was of the greatest importance. In these cases I confined myself entirely to the primary ligation of the jugular at the point of election, and hastily opened the mastoid cortex, without attempting to freely curette the cells or establish a communication of the antrum, or, still more important, not attempting to uncover the lateral sinus or to ascertain the condition of the vessel. The operation in these cases did not take over fifteen minutes, and two out of the three recovered, it being of course necessary to complete the operation at a later date.

Now, having decided to do this type of operation, should we ligate the jugular before exploring the lateral sinus, or after? This seems to be the disputed point and is the only one

in which I see any difference in opinion among the surgeons in the hospital I represent. In the majority of the sixty operations I am reporting the jugular was ligated prior to opening of the sinus, and I am bound to state that there is no great difference in the mortality between those where it is ligated first and those where it is ligated last; in fact, as will appear later, most of the cases that died were particularly septic at the time of operation, and several of them died three or four hours after etherization, but on searching the cases there were no signs of metastases prior to the operation, but an immediate metastasis after the operation, to my mind undoubtedly due to the fact that, a considerable amount of exploring and probing having been done, a portion of the jugular clot was loosened. This of itself seems to me so sufficient to condemn this surgical procedure. One of these died; two recovered.

If we have decided to ligate the jugular at all, we should do so on the general symptomatology. It does us no good to expose the lateral wall of the sinus, as it is often impossible to tell from the outside of the sinus whether a thrombus exists or not. The outer wall may be hard and yellow and covered with granulation from merely an external dural thickening or from the existence of a perisinus abscess, and in such cases there may be intrasinus disease; or we may have sinus clot either parietal or central where the vessel looks normal and where a simple puncture may show free blood.

In fact, the best time to operate upon otitic septicemia is before the formation of sinus clot, in the early stage of beginning thrombosis. Having decided to operate, always ligate the jugular first. You can then explore the sinus as much as you please, without any risk to the patient, and remove what thrombus you find in the vessel without fear of possible formation of metastatic abscess, which may be far more serious to the patient than the original disease.

An analysis of these sixty cases reveals some interesting points. In the first place as to infection. The microorganism recovered from the cultures was in a large proportion of cases streptococcus. Out of thirty-five cases where the records stated that the culture had been taken, streptococcus was found in fifteen, streptococcus and pneumococcus in two, streptococcus and staphylococcus in four, "mixed infection" in four, pneumococcus in two, staphylococcus in seven, tubercle bacillus

in two, thus agreeing with the statement made by Dr. Gruening in a paper entitled "Sinus Thrombosis of Otitic Origin and Its Relation to Streptococcemia," *New York Medical Journal*, June 5, 1909.

The two cases of tubercular thrombosis were both proven by injection into a guinea pig, in addition to the ordinary examination. One recovered and one died from acute miliary tuberculosis subsequent to operation.

Two cases were subsequent to a broken-down blood clot operation causing a perisinus abscess.

One case was an acute streptococcus infection subsequent to an adenoid and tonsil operation. Four days after the adenoid and tonsil operation a mastoid operation was performed and the lateral sinus found thrombosed. The culture from the sinus showed streptococcus, and the case also developed a cerebral abscess, and a lumbar puncture showed free streptococci in the spinal fluid. The patient died eight days after the last operation.

Five cases had metastases, three of which were abscesses in the lung, two of which had a general streptococcus infection. Two out of the three recovered. The other metastases were all joint infections, mostly multiple, but none died. In the cases with metastases, therefore, the mortality was 20%. A resumé of the cases which died may not be out of place, as I desire to prove that in these cases no amount of extensive dissection of the vein would have proven more efficacious than the simple ligation that was performed. It will be noticed that in many of the patients meningeal symptoms were present, and I think a fair analysis of the symptoms will show us that in many of them basilar meningitis or cerebral abscess were present and were the probable cause of death. In fact, out of all the cases only two died from pure septicemia. In my own experience in private practice, as well as in the hospital, basilar meningitis has been the common cause of death, and is due sometimes to extension backward of the purulent process in the sinus. These cases probably have a diminished general resistance and are unable to prevent the extension of the disease process.

In some of the others an error in diagnosis was made, and such were never cases of thrombosis of the sinus at all, but were meningitis with ill-defined symptoms. This is a difficult

diagnosis at times to make, but I have included in this series all cases of operation on the sinus or jugular in order to avoid any error in the mortality statistics.

To proceed with the analysis of individual cases.

CASE 1.—A child with acute meningitis and thrombosis of the internal jugular vein. A radical operation was performed and the jugular ligated, and the case died four days after the operation.

At the postmortem there was found a basilar tubercular meningitis and general miliary tubercular infection. It is quite obvious that this case could not be saved by any type of operation.

CASE 2.—Acute suppurative middle ear with mastoid, complicated with pregnancy at term. The aural disease had existed for 21 days. The white count was 6,000 whites, 78% polynuclear cells, and the mastoid was found full of pus and freely opened. The jugular was ligated first and the lateral sinus explored afterward at a second operation.

The culture from the resected vein showed pure streptococcus. The patient died two days after the jugular operation and four days after the mastoid operation, and was only sick four days in the hospital.

CASE 3.—A child. The records state the duration of the aural disease four days, which seems to me probably a mistake. The child died thirty-two days after the operation, having had a cerebral abscess, peritonsillar abscess, sinus thrombosis, a mastoid operation and ligation of the jugular and four major operations. It apparently died of exhaustion. The culture from the vein showed streptococcus and staphylococcus, and free streptococci were found in spinal fluid.

CASE 4.—Chronic case of ear disease; one year's duration. A mastoid operation was performed first, the jugular was ligated and the lateral sinus was opened together three days later. Patient died two hours after the operation. Culture from fluid blood in the lateral sinus showed a pure culture of streptococcus. A culture from the ear discharge showed streptococcus and staphylococcus and there was also a general leptomeningitis. The patient was in the hospital five days.

CASE 5.—An adult, sick only one week with an acute ear infection, following influenza. A mastoid operation was performed only one week after the original infection, and was followed

by ligation of the jugular twenty-four hours later. A culture from the jugular showed diplococcus catarrhalis. The patient died of septicemia five days after the operation.

CASE 7.—Acute pneumococcus infection; three weeks' duration. A mastoid was first performed, at which operation a perisinus abscess was found. There were multiple metastases, and the case died three days after the operation.

CASE 8.—Acute infection; sick two weeks in the Massachusetts General Hospital, with a diagnosis of typhoid. There was an enlarged spleen, double optic neuritis and a rapid elevation of temperature to 104° and Kernig reflex. White count 17,000. A mastoid operation was performed and the lateral sinus explored before the jugular was tied. There was free bleeding from the sinus at time of operation. Thirty-six hours later a metastasis developed in the left elbow and forty-eight hours later in the lung. The case died three weeks after operation.

This is one of the cases where I think it is possible had the jugular been ligated prior to opening and curetting of sinus a fatal result might have been avoided.

CASE 9.—Chronic case. A radical mastoid operation was done and a perisinus abscess found with a purulent thrombosis of the sinus and jugular. The case died with meningeal symptoms three days after the operation.

From my own experience I have, therefore, arrived at the following conclusions:

First—Operate early, wherever possible, in the preliminary stage of formation of thrombus rather than after a thrombus is formed.

Second—The symptoms which suggest the formation of a thrombus in the order of their diagnostic importance are, wherever in the existence of a freely discharging ear, with or without a tender mastoid, the patient presents a septic temperature with or without chills, but without cerebral symptoms, continuing three days or more, with no obstruction to drainage of the middle ear as far as can be seen, an optic neuritis more frequently unilateral than bilateral or increasing leucocytosis with a high polymorphonuclear percentage. Excepting that in the case of young children all these symptoms, except the optic neuritis, may exist without thrombosis.

Third—Operate always where, in addition to some or all of these early symptoms, there are symptoms indicating a metastasis, which, judging from these sixty cases, is usually first in the lung, second in the joints and third superficial. In this class of cases we must not expect our mortality to be as slight as in the earlier operation.

Fourth—Judging from my own personal experience, as well as that derived from the sixty cases here reported, the route of general infection in the overwhelming majority of cases seems to be the natural channel afforded by the lateral sinus and its extension into the internal jugular vein. The simple ligation of the vein, if possible, below the point of thrombus seems to be equally effective in cases of softened thrombus, firm thrombus or formative thrombosis. It should always be performed as early as the diagnosis can be made with certainty, but it is not necessary to resect the vein or bring the end of the vein out of the neck as a drainage tube. It is not even necessary where time and absence of shock is a factor of importance to perform a thorough mastoid operation or to open the lateral sinus above and remove the thrombus in that portion of the vessel, although this should always be done, except under these circumstances.

XXVIII.

THE SERODIAGNOSIS OF SYPHILIS IN ITS RELATION TO DISEASES OF THE EAR.

BY EDMUND PRINCE FOWLER, M. D.,

NEW YORK.

The vastness of the subject manifestly makes it impossible to review within the limits of one paper of ordinary length the subject of syphilis in its relation to and occurrence with diseases of the auditory apparatus. I shall, therefore, limit my remarks to a report of the 128 cases whose blood serum I had analyzed by the complement fixation test, arranging these cases in groups, detailing important facts brought out by the examinations and calling attention to some aspects of the subject which strike me as worthy of special consideration.

The method devised by Dr. Hideyo Noguchi was used throughout, and owing to his great kindness I was fortunate enough to have all the specimens of serum examined by the originator of the method himself.

If these cases illustrated nothing from the standpoint of the otologist, they would still be of great interest as adding further proof as to the dependability of Noguchi's method.

It may be well here to briefly state in the author's own words the main differences and advantages of his own method as compared with that of Wassermann and others:

"It is important to bear in mind that the main difference between my system and the Wassermann system lies in my use of a known quantity of amboceptor, while in the Wassermann system we meet a difficulty in the fact that human serum may contain anywhere from 0 to 20 units of natural hemolysin (amboceptor) capable of inducing hemolysis of sheep's corpuscles. This introduces an uncertain factor into the interpretation of the results, inasmuch as an excess of anti-sheep amboceptor leads to hemolysis even in the presence of syphilitic antibody. Any system using foreign corpuscles, such as

that of Bauer, Hecht, Stern, and Detre, is equally apt to give fallacious results.

Minor differences often of great importance to the individual doing the test are: (1) In my system it is possible to preserve the various reagents, such as antigen, amboceptor, and, if necessary complement, in stable form, dried on filter paper and then titrated, ready for use; (2) in my system the quantity of blood necessary for the test is very small, only a few drops; inactivation is not necessary and the blood need not be fresh; (3) the ease with which certain of the reagents can be procured is a factor; in my system human corpuscles are used, and the patient's own cells can be utilized. In all the other methods it is necessary to have a fresh supply of corpuscles, sheep's, horse's, etc., always on hand; (4) all the other methods require a complete laboratory, while any laboratory worker can do my test with a very small equipment." (See *J. A. M. A.*, p. 935, Vol. LIII.)

On my suggestion, in about twelve cases serum obtained by using blistering plaster was tested, and subsequently serum obtained in the usual way from these same patients gave reactions identical with the first. In many cases, unknown to the tester, two and even three specimens were examined, and always with the same result, and in no instance was a diagnosis of the disease or a word as to its syphilitic probabilities intimated. This is, I believe, the first time that blister serum has been used for these hemolysis tests.

Results Obtained With Noguchi's Modification of the Wassermann
in Diseases of the Ear.

	Strongly Positive.	Weakly Positive.	Doubtful.	Negative.	Total Cases.
Children.					
O. M. S. Ac.....	1	3	3	20	32
O. M. S. C.....	5	4	2	13	24
O. M. C. C.....	0	1	0	2	3
Mastoiditis	1	1	1	2	5
Nerve deafness	0	0	0	2	2
Total cases	7	14	6	39	66
Sex. Males	2	1	3	19	25
Females	5	13	3	20	41
Percentages in children....	10½%	21¼%	9%	59%	100%
Adults.					
O. M. S. Ac.....	0	1	2	7	10
O. M. S. C.....	0	1	2	10	13
O. M. C. Ac.....	0	0	0	2	2
O. M. C. C.....	5	3	3	18	29
Mastoiditis	0	1	0	2	3
Nerve deafness	3	1	1	0	5
Total cases	8	7	8	39	62
Sex. Males	6	2	1	24	33
Females	2	5	7	15	29
Adult percentages	13%	11%	13%	63%	100%
Total cases in adults and children:					
Males	8	3	4	43	58
Females	7	18	10	35	70
	15	21	14	78	128
Total percentages in adults and children	11¾%	16%	11%	61%	100%
Total positive percentage					
in Males	6¼%	Total negative percentage			
Females	5½%	in Males.....	39 %	45%	
		Females	49¼%	55%	
	11¾%		88¼%	100%	

In the children hypertrophied tonsils and adenoids were present as follows:

Disease.	Strongly Positive.	Mildly Positive.	Doubtful.	Negative.	Totals.
O. M. S. Ac.....	0 in the 1 case	6 in the 8 cases	2 in the 3 cases	14 in the 20 cases	22 in the 32 cases
O. M. S. C.....	4 in the 5 cases	2 in the 4 cases	1 in the 2 cases	13 in the 13 cases	20 in the 24 cases
O. M. C. C.....	0 in the 0 cases	0 in the 1 case	0 in the 0 cases	0 in the 2 cases	0 in the 3 cases
Mastoiditis	0 in the 1 case	0 in the 1 case	1 in the 1 case	0 in the 2 cases	1 in the 5 cases
Nerve deafness	0 in the 0 cases	0 in the 0 cases	0 in the 0 cases	0 in the 2 cases	0 in the 2 cases
Total present	4 in the 7 cases	8 in the 14 cases	4 in the 6 cases	27 in the 39 cases	43 in the 66 cases

IN CHILDREN:

In O. M. S. Ac. cases the ear disease was right, left or double about an equal number of times.

In O. M. S. C. cases the ear disease was right and left equally often and double twice as often as either.

IN ADULTS:

In O. M. S. Ac. cases the ear disease was right and left equally often and double in no case.

In O. M. S. C. cases the ear disease was right and left and double equally often.

In O. M. C. C. cases the ear disease was almost always double.

Of the 128 cases examined, 66 were children and 62 were adults.

Of the 15 strongly positive cases, 2 children and 3 adults gave specific histories; 1 adult was diabetic, and another gave a history very suspicious of syphilis. The serum from the mother of one of the children giving syphilitic histories reacted strongly positive to the test. The father of the other child had syphilis, and the child a syphilitic iritis.

Two children disappeared, but all the others were cured.

All the adults improved under antisyphilitic treatment.

Of the 21 weakly positive cases, of the 14 children, 5 disappeared, 6 were cured, 1 improved, 2 not improved. Of the 7 adults, 2 disappeared, 2 were cured, 2 improved, 1 not improved. One woman, who improved markedly under specific treatment, had syphilitic iritis, and nerve deafness in both ears. She had been under treatment for many years.

Of the 14 doubtful cases, of the 6 children, 3 disappeared, 1 was cured, 1 died of diphtheria, 1 did not improve. Of the 8 adults, 1 disappeared, 4 were cured, 2 much improved, 1 not improved.

Of the 78 negative cases, 1 adult gave a history of syphilis, but as she had been under treatment for the disease for many years, it is not surprising that repeated examinations failed to elicit a positive reaction. In this connection it is important to remember that the absence of a positive reaction does not absolutely disprove the existence of syphilis, but that the consensus of opinion is that its presence is strong evidence that the patient is infected with active luetic poisons.

In the 66 children hypertrophied tonsils and adenoids were present in 43 cases. Four of these cases gave strongly positive reactions. They were all in cases of chronic suppurative otitis.

The comparative frequency of positive reactions in children and adults is remarkable, as is also the percentage of males to females, and the ear diseases which seem to be most frequently accompanied with positive reactions in these two classes of patients. Strongly positive reactions occurred in 10 2/3% of the children and in 13% of the adults.

Weakly positive reactions occurred in 21 1/3% of the children and in 11% of the adults.

This gives a total strongly positive reaction in adults and

children of 11 2/3%. Note that in only 35 cases was there doubt as to the reaction, and that these percentages were calculated on the basis of counting all the doubtful reactions as negative, although it is fair to presume that some were really in syphilitics. If to the strongly positive cases we add the one weakly positive case and the one negative case giving specific histories (both in women), the total syphilitic percentage would be: in adults, 16%, and in adults and children, 13 1/3%.

Of the 128 cases examined, 58, or 45%, were males, and 70, or 55%, were females. The number of reactions occurring in males and females appears as follows:

IN CHILDREN.

Males. Females.		Males. Females.	
Strongly positive.....	2 5	Weakly positive.....	1 13
		Doubtful	3 3
		Negative	19 20
		—	—
		23	36

IN ADULTS.

Strongly positive.....	6 2	Weakly positive.....	2 5
		Doubtful	1 7
		Negative.....	24 1
		—	—
		27	27

IN ADULTS AND CHILDREN.

Strongly positive.....	8 7	Weakly positive.....	3 18
		Doubtful	4 10
		Negative	43 35
		—	—
		50	63

In children it would appear that a positive reaction is about twice as prevalent in females as in males, taking into account the number of cases of each sex examined.

In adults it would appear that a positive reaction is nearly three times more prevalent in males, taking into due consideration the number of cases of each sex examined. Adding the two women who reacted negatively or doubtfully, but who gave

specific histories, the proportion of males to females would be as 3 : 2.

In adults and children the percentages were as follows:

STRONGLY POSITIVE.		WEAK, DOUBTFUL OR NEGATIVE.	
Males	6.25%	Males	39.00%
Females	5.50%	Females	49.25%
<hr/>		<hr/>	
11.75%		88.25%	

In other words, practically 12% of all the cases tested were positive, and the males furnished $6\frac{1}{4}\%$, and the females $5\frac{1}{2}\%$ of these cases.

The diseases of the ear most frequently accompanied with positive reactions in children were the acute and chronic suppurations. Seven cases out of sixty-one in these diseases gave strongly positive reactions. The number of the other ear diseases in children was not sufficient to base any reliable calculations on the statistics thereof.

In adults nerve deafness was accompanied with a positive or suspicious reaction in every one of the five cases examined. In chronic catarrhal otitis media, five out of the twenty-nine cases examined gave a positive reaction. There were no strongly positive reactions in the suppurative cases in adults.

In the five cases of nerve deafness, three gave positive histories of syphilis, one a very suspicious history, and one no history of the disease.

Noguchi has published his results in diseases in which syphilis was an etiologic factor, or in which it could not be excluded as a possible cause of the condition, and among these the eye cases showed 50% positive reactions, and the brain tumor cases 50% positive reactions. These latter are particularly interesting to the otologist, and would indicate that in every case of brain tumor operation should be deferred until the blood serum has been tested for the syphilitic reaction.

The cases I examined were all suffering from some ear disease and, with one or two exceptions, appeared to harbor no other ailment at the time the tests were made. They are of unique interest, therefore, from the standpoint of the reliability of the test. Noguchi found in 335 cases in which syphilis could be excluded with a fair degree of certainty, that only

twelve reacted positively. Seven of these were leprosy, and five were scattered among five other diseases, including two malignant neoplasms and one scarlatina. Subsequently the scarlatina case proved to be syphilitic, and infected with this disease two surgeons who operated upon her. With the exception of leprosy, therefore, practically all were negative. The reason for the large proportion of positive reactions in leprosy is as yet unknown.

From the above, and from the remarkable coincidence of my histories of syphilis with the positive reactions, it is fair to presume that in my 128 cases the great majority, if not all, of those reacting positively to the test were, in fact, syphilitic, and that in many cases the ear disease depended, at least in part, for its inception, and in larger part for its chronicity, on some influence of the syphilitic taint in the tissues.

• In children 50% of the cases examined were acute inflammations, and in these but two gave a positive reaction. In the chronic cases five were strongly positive, all in chronic suppurations. This would indicate that in children 15% of all chronic diseases of the ear are accompanied with active syphilis.

In adults nearly 50% of the diseases were chronic catarrhal otitis media and nerve deafness, about equally divided between the two sexes. It is startling to find that all the strongly positive reactions occurred in these cases. Almost one-fourth gave strongly positive reactions. Not one of the suppurative cases gave a positive reaction.

It is a recognized fact that the bones of the skull are frequently affected during the course of syphilis, that this process is usually extraordinarily slow, and not very infrequently may end favorably, but it is not generally taught that the diseases of the bony and connective tissue structures of and about the inner and middle ear are as often associated with syphilis as a study of my series of cases would lead one to believe. I can not go into this further in this paper, but I believe many cases of catarrhal sclerosing and suppurative otitis derive their tendency to chronicity, if not in large measure their inception, from the effects of acquired or inherited syphilis, and that these cases could be markedly benefited if the surgeon will keep in mind their possible presence and combine with his

other treatment a rational and energetic treatment of this terrible disease.

SUMMARY.

Syphilis is more frequently associated with diseases of the ear than clinical observations would suggest.

The reason for its non-recognition has been the lack of a reliable test for its detection, its denial by the patient or parents, and the failure on the part of the surgeon to look for the disease.

In Noguchi's modification of the Wassermann reaction we possess a simple, inexpensive and valuable test for active syphilis.

In children suffering from ear disease, females are congenitally syphilitic twice as often as males.

In adults the greater proportion having the disease is in the male sex.

The proportion of positive reactions in adults and children is about equal.

In children with ear disease the great majority of positive syphilitic reactions occur in cases suffering from suppurative diseases of the middle ear and its surrounding bony cavities.

In adults the greater number of positive reactions occur in cases of nerve deafness and chronic catarrhal otitis media.

The presence of hypertrophied tonsils and adenoids seems to bear no relationship to the complement fixation reaction.

Marked benefit to the auditory apparatus and to the general health regularly follows antisyphilitic treatment in cases giving a positive syphilitic reaction.

Approximately 12% of all diseases of the middle or internal ear give strongly positive reactions to the complement fixation test.

Syphilitic affections of the internal ear would appear, as a rule, to be late manifestations of the disease.

.57 West 76th Street.

XXIX.

THE REPORT OF A CASE OF CEREBRAL ABSCESS
OCCURRING IN CONNECTION WITH A
CHRONIC MIDDLE EAR SUPPURATION.

BY HUGH B. BLACKWELL, M. D.,

NEW YORK.

In point of vagueness which serves to characterize its many atypical clinical manifestations, otitic temporosphenoidal abscess of the right hemisphere may be likened to a number of general bodily ailments, which frequently evince themselves by symptoms of an indefinite nature, and from which we are as often puzzled to make a differential diagnosis when confronted by this grave complication of middle ear infection.

Unfortunately, no single otologist has as yet, owing to their comparative infrequency, secured enough of these cases to have enabled him to solve the problem of their postoperative management, and for this reason it has come to be properly regarded as the duty of every surgeon to report all of the cases of brain abscess which occur under his observation, whether the result be successful or not. If in the discussion, which I hope will follow my few brief remarks, any light is thrown on the above question, I will consider that my obligation has been well discharged.

History—Patient, F. H., a woman, age 25, was admitted to the service of Dr. Robt. Lewis, at the New York Eye and Ear Infirmary, on May 1st, 1909, for radical operation, with the following history: About one year before this date she was suddenly seized with an acute attack of pain in her right ear. She had never suffered from ear trouble of any kind previous to this onset. This earache continued for several days, when a myringotomy was performed and the pain was relieved. Since that time there has been a profuse discharge of pus from the right ear, and for the past ten months it has been noticeably foul in odor. During this period there has been several at-

tacks of severe pain in the ear, accompanied by some headache, but no dizziness or vomiting.

On admission patient's general physical examination proved negative. Aural examination showed that the canal was filled with a profuse discharge of very foul pus. The fundus of the canal was occupied by several good-sized masses of polypoid granulation tissue. The drum was apparently destroyed, bare bone could be felt in the tympanum. There were no evidences of acute mastoid involvement. A few hours after admission the patient having been properly prepared, a radical operation was performed upon her right ear. The sigmoid sinus was found to be located far forward, and a small area of the vein wall was exposed just below the knee. It was of normal appearance. The middle fossa was low and overhanging, and while cleaning out the cells on the under surface of the tegmen tympani a small portion of the tegmen was removed. This opening was subsequently enlarged to about one centimeter square. The dura, which was exposed, was apparently healthy and not injured during this procedure. The posterior bony wall was next taken down, and quite a considerable quantity of polypoid granulations were removed from the tympanum, together with necrosed ossicles, etc. The operation was now completed in the usual manner, the wound was cleansed, flushed with alcohol and a dressing applied, the posterior wound being entirely united and iodoform gauze being used as tympanic packing.

On the day following the operation the patient complained of some headache and nausea, which were attributed to the usual causes. On the following day the headache persisted, although the nausea was better. On the third day the entire outside dressing was removed, revealing the soft parts in a normal condition. From the third to the eighth day temperature ranged from 99° to 101°, and the headache became much more severe, being paroxysmal in character. On the fifth day the tympanic gauze was removed, revealing a perfectly normal cavity. The posterior wound had healed by first intention. On the eighth day the temperature became normal, and remained practically so until the thirteenth day. During this time the headache still continued. On the eleventh day blood examination showed 13,200 leucocytes, with 76% of polymorphonuclear cells and malarial examination negative. On the

thirteenth day another examination showed 10,500 white cells, 72% of polymorphonuclear cells. Malarial examination negative. On the morning of the thirteenth day temperature was 100, fundi normal, and in the afternoon, for the first time, patient began to show evidences of stupor and somnolence; pulse around 50 and 60. She was very slow to answer questions, but there was no aphasia or paralysis. The somnolence rapidly increased, and on the same afternoon she was removed to the operating room. The patient having been properly prepared, an incision was carried down through the old cicatrix and extended forward from its upper extremity almost to the external angular process of the frontal bone. A posterior cut extending backward two inches from the old incision was then made. The soft parts, including periosteum, having been elevated, were retracted, and the entire bony floor of the middle fossa down to the antrum was removed. The dura over the tegmen antri, which was exposed during the primary radical operation, was found to be in a normal condition, covered with healthy red granulation tissue. On removing the skull covering the external surface of the temporosphenoidal lobe, there was observed a bulging spot in its cortex, about the size of a dime, located in the middle temporal convolution and about on a vertical line drawn through the external auditory canal. A brain knife was then inserted into this bulging area and passed downward, forward and inward for a distance of about $1\frac{1}{2}$ inches and turned at right angles. Instantly the pus, thick, creamy, yellow, non-odorous, and evidently under great pressure, spurted up alongside the handle of the knife. This opening in the dura was now extended to about one inch in length, and a pair of closed, smooth thumb forceps cautiously introduced between the lips of the incision and passed into the abscess cavity. They were then allowed to open. In this way a very good view of its interior was obtained. The abscess apparently had no walls, being lined by softened dark brain tissue. Fully one ounce of pus was evacuated. An incision was now made into the under surface of the temporal lobe, just above the antrum, and carried up to the abscess cavity. Two bone tubes were then inserted into the external cortical, and one in the inferior cortical incision, until their extremities were felt to meet in the interior of the abscess cavity, in this manner establishing drainage in both directions

from the infected area. The wound was now lightly packed with iodoform gauze and an external dressing of wet saline applied. While under the anesthesia and before the opening of the abscess the patient's pulse ranged from 48 to 68. Immediately after the evacuation of the abscess it was 108, and at the close of the operation 72.

On the day following the operation patient's general condition was very much improved. Sensorium was comparatively clear. For the first time in two weeks the day passed without an attack of headache. The wound was dressed, there was no evidence of hernia, but a very profuse discharge. The patient lived for ten days after the operation, during the first nine of which the temperature ranged irregularly from 99° to 104° and pulse from 72 to 100. The wound was dressed every day, and on each alternate day the bone tubes were taken out, cleansed and then replaced. On the 19th, or five days after the evacuation of the abscess, owing to the improved wound condition and the diminution of the discharge, the inferior drainage tube was removed. Two days later patient's temperature rose to 104°. An encephaloscope was then used for the first time to explore the abscess cavity. This was thoroughly done, with a negative result. The inferior drainage tube was then replaced. On the following day the temperature was somewhat lower, but the patient was very restless. On dressing the wound a moderate sized brain hernia was, for the first time observed, presenting from the external surface of the cerebrum. This was left alone. On the next day the hernia was about twice as large, being now about the size of a small orange. Most of the extruded tissue being necrotic, was clipped off. The discharge was of a very foul odor. Patient's general condition was much worse, evincing all of the symptoms of a general meningitis. Temperature, 105°; pulse, 148; stiff neck, delirium, strabismus, etc. Death took place on the following day, preceded by an antemortem rise of temperature to 107.4°.

The interesting points occurring in connection with this case are:

First—Did the abscess develop subsequent to the performance of the radical operation? And, if so, was the dural exposure a factor in its causation?

Second—Granted that the abscess was present in a cold

or latent condition prior to the radical operation, did its performance serve to excite the cold process into full activity, digest its walls, etc.?

Third—Are we justified in performing the Stacke operation in cases which present this symptom of intense paroxysmal headache, which we cannot attribute to other causes, without at the same time making exploratory punctures of the brain, even though the cardinal symptoms of abscess, such as somnolence, slow pulse, aphasia, paralysis, etc., be absent. Certainly had this course been pursued in the present case the patient's chances of recovery would have been infinitely greater.

The facts as demonstrated by the case are:

First—The apparent impossibility of making an absolute diagnosis in all cases of right-sided abscess of the temporo-sphenoidal lobe during an initial or latent abscess condition.

Second—The importance of recognizing the condition and operating during the initial period of the disease.

In conclusion, I would add that, despite the present unfavorable experience, I am in favor of using some rigid tubular instrument with noncollapsible walls for purposes of drainage in these conditions, and also of making counter-openings through the floor of the temporo-sphenoidal lobe, whenever the abscess occurs fairly low down in that structure. In the present case, the diffuse encephalitis, as evidenced by the hernia cerebri, did not take place until after the inferior drainage tube was withdrawn. I believe that its use greatly facilitates the escape of septic material, which would otherwise be apt to accumulate in this, the most dependent portion of the wound.

XXX.

LATENT MASTOIDITIS WITH EPIDURAL ABSCESS.

BY ALFRED BRAUN, M. D.,

ASSISTANT SURGEON, MANHATTAN EYE, EAR AND THROAT
HOSPITAL,

NEW YORK.

We have all met with cases of mastoiditis, of all grades of severity, from the slight congestion of the mastoid process, which accompanies a large proportion of the cases of acute middle ear suppuration and which clears up spontaneously in a few days, to the cases which give rise to serious intracranial complications and often end in death.

However, it is often difficult to decide, from the clinical picture, as to how serious a case of mastoiditis we have to deal with. The severity of the clinical symptoms is not always in accord with the extent of the pathologic changes.

In the past six months the writer has had under his observation five cases in which there was a very close similarity in the clinical appearance and course, as well as in the pathologic findings, but in which the severity of the actual disease process was out of all proportion to the seriousness of the clinical symptoms.

In all five cases operation showed extensive destruction of the mastoid cells with erosion of the inner table and epidural abscess. In no case did the patient feel sick enough to go to bed. Four of the cases were in laborers and the fifth was a housekeeper. All kept on attending to their work until the last minute. In each case it was extremely difficult to persuade the patient that he was sick enough to require an operation.

They began with symptoms of a mild suppurative middle ear inflammation, with slight or no pain, some deafness, and ringing in the ear. In one of the cases there was no discharge,

except for a few days at the beginning of the disease. In the other four cases there was a moderate discharge throughout the disease.

There was some edema of the posterosuperior canal wall in all of the cases. A slight amount of mastoid tenderness on very deep pressure, was present, at times, in all of the cases. Most of the time there was no tenderness at all. In three of the cases there was slight edema over the mastoid for a few days before operation.

The temperature was never above 99.5° F. in any of the cases. Most of the time there was no elevation of the temperature.

The disease extended over a period of six to twelve weeks (one of the cases lasting six months), with periods when there were absolutely no local symptoms of mastoiditis.

However, there was something in the general appearance of the patients—in the facial expression and color—which showed that there was some serious trouble going on.

The cases were all seen in Dr. Berens' service, at the Manhattan Eye, Ear and Throat Hospital.

CASE 1.—Sarah O., age 49 years, a housekeeper, was first seen on August 5, 1909. She complained of a feeling of fullness, deafness and ringing in her right ear, for one day. There was no pain. Examination disclosed a red, bulging drumhead. A paracentesis was done, liberating a small amount of mucopurulent discharge. Hot bichlorid irrigations were ordered. There was a slight improvement in the subjective symptoms for two days. Then she complained of a little pain behind the ear. There was a slight tenderness over the mastoid, which disappeared in a day or two. Moderate purulent discharge. Some edema of posterosuperior canal wall. General condition good. No elevation of temperature. Attends to her work of keeping house for a doctor.

On September 7th, four and a half weeks after the onset of the disease, there was again slight tenderness over the mastoid antrum, on very deep pressure. There was no pain. The patient merely complained of a feeling of fullness and numbness in the ear. The otoscopic picture was the same as before. There was a moderate sized perforation of the drumhead, with a slight purulent discharge, and edema of the posterosuperior canal wall. No temperature. On account of the persistence

of symptoms, even though slight in degree, over so long a period of time, operation was advised, but refused. Patient says she does not feel sick and has no pain, and cannot believe there is anything seriously wrong with her. Continues to attend to her work.

September 9th, condition is the same. Operation again advised. Patient promised to come into the hospital the next day, but did not come. When again seen, on September 11th, patient says she feels much better. The ear doesn't feel so full.

On September 13th, temperature is 99.2° F. Slight edema over the mastoid. Patient says she feels good. Operation again advised. Patient consents to come into the hospital the following Monday, as she had some work to do until then.

On Saturday, September 18th, she was again seen. The postauricular edema had increased. Mastoid tenderness a little more marked. No pain. Temperature, 99° F. Operation consented to.

Operation showed a very thin cortex, mastoid cells and antrum broken down and full of pus. Inner table eroded over sinus, over an area about three-fourths of an inch in diameter. Perisinus abscess.

Recovery was uneventful.

CASE 2.—Peter S., 54 years of age, a fireman, was first seen on May 29, 1909. He had had a cold in April, about six weeks before he appeared at the clinic, followed by slight pain in the left ear. The ear began to discharge in a couple of days, upon which the pain disappeared. There was a feeling of numbness and itching in the ear, and some deafness. Bichlorid irrigations were ordered, and the discharge stopped after two weeks. In the beginning of July the ear began to discharge again. There was no pain. Occasionally he had a slight amount of tenderness over the mastoid, for a day or two. He had no elevation of temperature at any time. He always attended to his work.

On July 15th operation was advised and refused.

On July 25th, 1909, there was a slight edema over the mastoid and in the posterosuperior canal wall. No pain or tenderness. He was admitted to the hospital, and operated on the next day, which was a little over three months since the onset of his trouble.

Operation showed a very thick, dense cortex. Interior of mastoid broken down and full of pus. Inner table eroded in the angle between sinus groove and middle fossa. A large epidural abscess, about two inches in diameter, extending over sinus, middle fossa and cerebellum was uncovered.

Culture from pus showed a mixed variety of bacteria.

Uneventful recovery.

CASE 3.—Patrick R., aged 35 years, a motorman, was first seen at the clinic, on July 15, 1909.

Three weeks before, he had had slight pain in his right ear, with discharge. Discharge and pain stopped in a few days. At times he felt perfectly well. Deafness and ringing in the ear. He continued to attend to his work.

Otoscope examination showed his drumhead to be reddened and thickened, but not bulging. No perforation. Some edema of posterosuperior canal wall. He was given bichlorid irrigations. He had occasional slight pain in the ear, which would last for a few hours, and then he would feel well.

On August 10th, about eight weeks after the onset of his disease, there was slight tenderness over the mastoid antrum, on very deep pressure. No temperature.

Operation was finally consented to, after much urging, and was performed on the following day.

Operation disclosed a very thick cortex. The mastoid was very badly diseased. There was much pus. Erosion of inner table, with an epidural abscess extending over an area $1\frac{1}{2}$ inches in diameter, above the knee of the sinus, and over the dura of the middle fossa.

Recovery was uneventful.

CASE 4.—John P., 22 years of age, a laborer, was first seen on March 11, 1909. Six weeks previously he had had slight pain with discharge and tinnitus in his left ear. The discharge persisted. The pain disappeared after a few days. Complained only of deafness and a dull feeling in his ear. He attended to his work all the time.

Examination showed a moderate sized perforation in the drum membrane, with purulent discharge. Some sagging of posterosuperior canal wall. Slight tenderness over the mastoid, on very deep pressure.

He was operated on the next day.

Operation showed a very thick cortex. Mastoid full of pus. Large epidural abscess over sinus and middle fossa.

Culture from pus showed extracellular diplococci.

Recovery was uneventful.

CASE 5.—James S., a bartender, 40 years of age, went in bathing on June 28th, 1909. The next morning he had severe pain in the right ear, which lasted four days, at which time the ear began to discharge. With the onset of the discharge, the pain disappeared. He went to the Brooklyn Eye and Ear Hospital, where he was treated for a week. On July 15th he came to the Manhattan Eye, Ear and Throat Hospital, complaining of some buzzing in the right ear and a profuse discharge. Examination showed a canal filled with granulations bathed in thick, creamy pus.

Bichlorid irrigations were ordered and the granulations removed several times. They recurred as fast as they were removed. The profuse discharge persisted. At the end of July there was slight tenderness over the mastoid. Operation was advised and the patient disappeared. He was not seen again until December 18, 1909, six months later. He said that he had been feeling perfectly well since I had last seen him, except that the discharge had persisted. He had had no pain whatever, and had always attended to his work.

Three days ago he began to have pain behind the right ear and some swelling. He thought it was probably a boil.

Examination showed the canal full of granulations and thick, creamy pus. There was some edema and tenderness over the posterior portion of the squama. The mastoid was not tender. Temperature 99° F., pulse 80.

A radical mastoid operation was done. As soon as the periosteum was reflected there was a gush of pus from a perforation about a quarter of an inch in diameter, situated in the posterior part of the squamous portion of the temporal bone. This led down to a large epidural abscess lying over the cerebellum, sinus and temporosphenoidal lobe. The dura was covered with granulations half an inch thick.

Culture from pus showed extracellular diplococci.

Recovery was uneventful.

It seems to me that there is a very obvious lesson to be drawn from a study of these cases, namely, that in cases of acute middle ear suppuration, where symptoms of mastoid involvement, no matter how slight, have extended intermit-

tently over a long period of time, it is our duty to advise immediate operative intervention.

Another point that I would like to bring out is this: Where the symptoms of an acute mastoiditis have subsided under conservative treatment, and after several weeks or months of good health, the symptoms recur, we are not dealing with a second attack of mastoiditis, in the majority of cases. We will usually find that the disease has been progressing continuously since the first attack, and these cases always show very extensive bone involvement with (not uncommonly) some intracranial complication. These cases should be operated on immediately upon recurrence of the symptoms.

Just why an acute mastoiditis should cause intense pain and severe systemic symptoms in some cases and should be practically painless, with scarcely any general symptoms in others, is very hard to say. It is not due to the character of the infecting organism, because various organisms were found in my cases.

In all of the cases the pus was under considerable tension, for when the cortex was removed the pus welled out with great force. In one of the cases there was fully an ounce of pus lying on the dura, and in another case about half an ounce, yet there was no headache or other sign of increased intracranial tension at any time.

The only way that I can explain the behavior in these cases is by assuming that the accumulation of pus, being very slow, the tissues had time to adapt themselves to the increased tension.

Of course, it is possible that these were all individuals with a diminished susceptibility to pain. We have all noticed, for instance, how differently patients behave when a paracentesis of the drum membrane is done without anesthesia. Some patients complain most bitterly of the pain, while others, even comparatively young children, say that the pain is very insignificant.

However, this lack of nerve sensitiveness would not explain the absence of general systemic symptoms. But we know that septic absorption from bone cavities is very slow, and a vigorous patient, with good resisting power, might easily dispose of the small amount of toxin as quickly as it is set free in the system.

156 East 61st Street.

XXXI.

REPORT OF TWO CASES OF LATERAL SINUS
THROMBOSIS TREATED, POSTOPERATIVELY,
WITH HISS' EXTRACT OF LEUCOCYTES.

BY SAMUEL McCULLAGH, M. D.,

NEW YORK.

In presenting a report of two cases, the writer fully realizes the futility of trying to draw any definite conclusions therefrom, but he feels that the results obtained from the administration of this extract were beneficial and therefore of interest, while in many other cases suffering from infections not coming within the range of our specialty, very favorable ones have been obtained.¹ For that reason he desires to call its use to the attention of those members of this section who are not already familiar with it, in the hope that a wider application may be obtained and its ultimate utility thereby determined. In lateral sinus thrombosis, exclusive of surgical intervention, our therapeutic resources are so meager and, if the knife has failed to relieve, so pitiful, that it behooves us to investigate with care anything promising aid in reducing the heavy mortality of this frightful condition. This extract interferes in no way with any other measures employed and so is an added weapon in our armamentarium. In these cases the prompt checking of the infection before the system is overwhelmed by the toxemia is such an important factor that where the isolation and cultivation of the specific microorganism of a given case with the preparation of a serum suitable for that case is necessary, the chances are that the critical point has been passed before the serum is ready for use. In other words, either by surgical intervention the focus of infection has been completely removed and the resistance of the patient has been able to check and overcome the toxemia, or it has been but partially removed, the manufacture of toxins proceeds unchecked and the resistance of the patient has been materially lowered

by the shock of a severe operation. Our knowledge of the thoroughness of the eradication of the focus is determined only by the subsequent course of the disease. Hope alternates with fear. How invaluable would be a remedy that would actively fortify the patient's resistance against the present toxemia and the danger of development of secondary foci!

This is neither the time nor the place nor has the writer the desire or ability to discuss the various theories as to immunity or the modes of action in serum or allied therapy. However, the following brief quotations from articles of Hiss, in which he describes this extract, are very much to the point. He says: "We have a differentiation of immunizing agents into those which, by virtue of their liberation and overproduction by the cells, such as antitoxins, amboceptors, agglutins, etc., are free in the plasma, and thus when active are immediately available for the protection of all the body cells; and into those agents by which certain cells primarily nourish and protect themselves and are only of benefit to the cell community at large by virtue of the direct intervention of these cells between the invading germs and their products and the highly specialized cells requiring protection."² The cells which intervene are the leucocytes. In his Harvey lecture, after discussing the type of immunity, a large part of the mechanism of which is individually cellular by phagocytosis and digestion and neutralization of endotoxins, he says: "It was this thought which suggested to me the idea of treating disease by aiding the leucocytes by furnishing them as directly as possible with the weapons which were being taken away from them in their fight with invading microorganisms, and to protect them thus from destruction and give them an opportunity to recuperate and carry on successfully their struggle against the invading germs. These weapons, whatever might be their nature, I assumed might possibly be furnished by an extract of the active substances of the leucocytes themselves—substances not ordinarily given up to the plasma or serum—and I also assumed that extracts would be more efficacious than living leucocytes themselves, introduced into the infected animal, since, if diffusible, they would be distributed impartially to all parts of the body by the circulatory mechanism and, as quickly as absorption would permit, relieve the fatigued leucocytes and protect, by any toxin-neutralizing or other power

they might possess, the cells of highly specialized functions."³

Preparation of the Extract.—This extract of leucocytes is usually obtained by double pleural inoculations of normal rabbits with a solution of aleuronat. This causes a sterile pleurisy with effusion, and the amount obtained after 24 hours is usually 30 to 60 cc. of turbid and often blood-stained serum. This is quickly centrifugalized, the serum decanted and the cell residue extracted in sterile distilled water for periods of from five to ten hours. A standardization of 20,000,000 leucocytes to 10 cc. of solution is made. After a few hours at $37\frac{1}{2}^{\circ}$ C. the extracts are preserved in the ice-box. Just prior to using, the tubes are shaken and all the contents used.

The following is a brief summary of the two cases. Both were in the service of Dr. Berens, at the Manhattan Eye, Ear and Throat Hospital:

Emma S., age 33, admitted November 12, 1908, with symptoms of acute mastoiditis on the left side, following an intranasal operation two weeks previously. A free paracentesis was performed. There was no abatement of the symptoms under treatment for 48 hours. On the contrary, the pain and tenderness increased, and there was a persistent elevation of temperature.

November 14.—A simple mastoidectomy was performed. An attempt was made to heal the wound by a modified blood clot. A temperature of $99\ 3\text{--}5^{\circ}$ at the time of operation fell to normal eight hours later.

November 15.—Maximum temperature 102° , minimum $99\ 3\text{--}5^{\circ}$. Severe pain in right ear, with redness and bulging of the drum. Paracentesis.

November 16.—Maximum temperature $103\ 2\text{--}5^{\circ}$, minimum 100° . Some redness and edema around wound and over scalp. Wound freely opened.

November 17.—Maximum temperature $104\ 4\text{--}5^{\circ}$, minimum $102\ 1\text{--}5^{\circ}$. Coughs frequently. Respiration irregular.

November 18.—Maximum temperature $104\ 1\text{--}5^{\circ}$, minimum 102° . Cough persists. Expectoration contains small particles of blood. Patient slightly delirious. Examination of chest negative. Differential blood count: Leucocytes 24,200, polynuclears 89%.

November 19.—Maximum temperature 105° , minimum 101° . Chill. Cough persists. Blood-stained mucus expectoration.

torated. Chest examination negative. Right drum membrane again incised.

November 20.—Maximum temperature 104 4-5°, minimum 100 3-5°. Absolute deafness in both ears. No granulation tissue in wound, which is covered with a dirty gray slough. No pneumococci found in sputum. Differential blood count: Leucocytes 11,170, polynuclears 90%.

November 21.—Maximum temperature 104 1-5°, minimum 100 2-5°. Second operation. The sinus was found collapsed and its wall excised. Free bleeding was established from the torcular end. The jugular vein was found thrombosed. It was ligated as low down and as high up as possible and exsected. The thrombus extended below the lower ligature. The patient withstood the operation fairly well. The delay in operating was due to doubt as to whether we were dealing with a larval pneumonia, basilar meningitis by extension through the internal ear, or sinus thrombosis.

November 22.—Maximum temperature 103 4-5°, minimum 100 2-5°. At 9 p. m. 20 cc. of Hiss' extract were injected beneath the skin of the abdomen. The temperature at this time was 102°. At 12 p. m. and 3 a. m. it was 100 2-5°, a drop of 1 3-5° in three hours, but the temperature was falling at the time the injection was given.

November 23.—Maximum temperature 104°, minimum 99 2-5°. Marked dysphagia has developed. At 9 p. m., the temperature being 103 4-5°, 24 hours after the first injection, a second injection of 24 cc. was given, followed in 12 hours by a drop of two degrees. The temperature at this time was on the decline also.

November 24.—Maximum temperature 103 2-5°, minimum 101 4-5°. Dysphagia very marked. Pneumonia on right side with well marked edema of the left lung. Delirious. Face and extremities markedly cyanosed.

November 25-26.—Maximum temperature 103 4-5°, minimum 99 2-5°. Condition unchanged.

November 27.—Maximum temperature 104 4-5°, minimum 100 1-5°. Condition practically unchanged. Oxygen has been given almost continuously for the past four days.

November 28.—Maximum temperature 102 1-5°, minimum 100 2-5°. The crisis of the pneumonia occurred four days after its onset. The patient was unconscious, extremely cyan-

osed, with very irregular and labored respirations. Her death was momentarily expected. At 9 p. m., the temperature being 100 3-5°, 20 cc. of extract were injected, followed in 6 hours by a rise of 1 2-5° to 102°, from which point it fell in 9 hours to 98 3-5°, with a natural sleep of several hours' duration. An examination of the eye grounds on this day showed hyperemia of the disks and the whole fundus, having the early pathologic appearance of neuritis. Disks slightly swollen.

November 29.—Maximum temperature 103 4-5°, minimum 98 3-5°. Dysphagia disappearing.

November 30.—Maximum temperature 103 2-5°, minimum 99 3-5°.

December 1.—Maximum temperature 99 4-5°, minimum 98 1-5°. Leucocytes 13,000, polynuclears 70%.

December 2.—Maximum temperature 103 2-5°, minimum 100°.

From this time on the temperature was practically normal through convalescence. The deafness, which had been almost absolute, gradually subsided and good hearing was restored. Time does not permit me to allude to the other therapeutic measures resorted to in this case which were used to combat symptoms as they arose only.

Nellie B., age 8, was admitted the night of December 17, 1909. There was a history of intermittent discharge from the left ear since early childhood. The ear had been dry for some little time before the onset of the present attack, which started one week ago, with pain in and behind the ear, but with no discharge. The temperature at the time of admission was 104 1-5°. There were symptoms of meningeal irritation and tenderness over the mastoid. Paracentesis was performed.

December 18.—Simple mastoidectomy was performed. The sinus was exposed and found collapsed. There was no free pus around the sinus, but a very foul-smelling gas escaped when the inner table was broken through. The sinus wall was excised, and free bleeding was established from the torcular end. The jugular vein was then ligated and excised. The patient was in very bad condition when removed from the table. During the four following days the temperature ranged between 105 and 101, and the condition of the patient became progressively worse, presenting the characteristic picture of an advancing septicemia.

December 23.—Maximum temperature 103 3-5°, minimum 101 4-5°. At 3:30 p. m. the temperature at that time being 103 3-5°, 10 cc. of Hiss' extract were administered, followed by a fall in eight hours to 101 4-5°, the lowest point it had touched since December 20.

December 24.—Maximum temperature 102 4-5°, minimum 101 4-5°. At 9:15 a. m. 10 cc. of extract were given, the temperature being 101 4-5°, followed in two hours by a rise of 1°. Two hours later it had fallen to 101 4-5° again. At 9 p. m. 10 cc. were again administered, the temperature being 102 1-5°. Three hours later the temperature had risen 3-5°, falling in twelve hours to 100 4-5°.

December 25.—Maximum temperature 102 4-5°, minimum 100 4-5°. At 9:45, 10 cc. of extract were given, the temperature being 101 1-5°. Three hours later it was 2-5° lower. The patient was much brighter.

December 26.—Maximum temperature 102 2-5°, minimum 100°. Ten cc. of extract were given at 3 p. m. The temperature was unchanged three hours later. The patient passed a restless night.

December 27.—Maximum temperature 101 4-5°, minimum 100°. Patient passed a very comfortable night and day.

December 28.—Maximum temperature 100 1-5°, minimum 98 4-5°.

The convalescence from this time on was uninterrupted.

A specimen of blood taken from a vein of the arm at the time of operation was contaminated, but an examination of a section of the clot from the jugular vein showed many cocci.

It may be justly argued, without fear of successful contradiction, that practically no proof capable of substantiation has been adduced that this extract was influential in the happy termination of these cases. The writer freely admits it. But his firm conviction, established by constant observation of the patients whose histories are here briefly given, is that this extract was a very useful adjuvant in the treatment. This was especially so in the second patient, where no complications existed, and the extract was given fairly early, and with a degree of regularity. The rapid clearing up of the toxemic depression of the central nervous system was the most striking feature. There was no constant effect on the temperature in either case.

It would be a waste of your time to suggest the infections of various localities and varying types in which this extract may be useful. The mode of action claimed for it opens up a very wide field to the vision of all. In conclusion the writer would urge that a fairer test of its usefulness can be made if it is administered early and regularly and not used as a last resort, as was the case in the first patient whose history has been given. Hiss recommends a dose of 10 cc. used as early as possible and repeated at frequent intervals—every three hours if necessary.

XXXII.

THE USE OF VACCINES, SERUMS AND THE HISS
EXTRACT OF LEUCOCYTES IN THE TREAT-
MENT OF EYE, EAR, NOSE AND THROAT
INFECTIONS, WITH REPORTS OF CASES.*

By J. G. DWYER, M. A., M. D., C. M.,

NEW YORK.

The expansion in growth of serum and allied therapy in the last few years, especially following the impetus it received when Wright, of London, published the results of his work on opsonins, has been so great and has opened up such new avenues for investigation, that the practitioner finds himself literally swamped by a deluge of new scientific terms, new methods of diagnosis and treatment and by a mass of literature on this important and fascinating subject. It is a matter of no small difficulty for the man busy with his everyday affairs to keep pace with this growth. This is more especially so if he is not trained to some extent in laboratory methods, as the use or administration of these measures is not a simple matter and belongs, not to the province of the clinician alone or to that of the pathologist alone, but rather to a combination of the two. Hence it is that the importance of these therapeutic measures is not more generally recognized, the indications and contraindications for their use are not borne in mind and their limitations are not sufficiently realized. It is with the hope of emphasizing these few facts that I present to you to-night the results of my work along these lines during the last three years. At the same time I take this opportunity of sounding a note of warning against the indiscriminate use of these methods without due consideration of the suitability or unsuitability of the cases and, what is perhaps more important, the ability

*Read by invitation before the New York Academy of Medicine, Otolological Section, March 11th, 1910.

of the man intelligently to use them, as more harm than good undoubtedly results from their administration in certain cases. This is not intended as a lengthy dissertation on this subject, but the endeavor has been made to give, in as brief and intelligent a way as possible, from an unbiased point of view, the practical results, reporting the failures as well as the successes and giving the conclusions to be drawn therefrom. In order to understand the criticisms and objections advanced against certain measures, it has been necessary for me to introduce certain scientific terms which are probably not familiar to everybody, but this has been done only where absolutely necessary.

In the first place, I will give a brief resumé of the work done, together with the results. In the majority of cases, vaccines were used; in the others, the Hiss extract of leucocytes. The second part of the paper will deal with the relative values of the various measures, the underlying principles and the indications and contraindications for their use.

Some two hundred or so cases were examined as to their suitability for vaccine treatment. Of this number, some 105 were selected, the balance being rejected for various reasons; some, because they were unable or unwilling to come for continued treatment; others, because the causal organism could not be isolated from the mixture of bacteria present in the discharge. Tabulating the cases on the basis of the offending organism, the list is as follows: Tubercle bacillus, 20; staphylococcus, 47; streptococcus, 7; gonococcus, 3; pneumococcus, 1; bacillus pyocyaneus, 7; bacillus catarrhalis, 3; bacillus of Friedländer, 3; bacillus of Frisch (rhinoscleroma), 2; mixed infection, 3; bacillus unknown, 9. The list of diseases is not limited to those of the nose and throat, but includes also some interesting general diseases and several cases of eye infections.

The tubercular bacillus cases comprised the following: Chronic tuberculosis of the lungs, 3; of the intestines, 1; of the bladder, 1; cervical glands, 6; larynx, 4; iris, 1; cornea, 1; also 2 cases of phlyctenular conjunctivitis and keratitis and 1 case of episcleritis. The results, on the whole, of tuberculin therapy, have been very satisfactory. In all the cases a diagnosis of tuberculosis was made by the various means at our disposal, such as the general physical examination, examination of the sputum and other excreta, the Von Pirquet cuta-

neous test and the Calmette ophthalmic reaction, also by the reaction to the injection of tuberculin. The kinds of tuberculin used were the bacillus emulsion and the new tuberculin of Koch, known as Tuberculin T. R. Of the three lung cases, two were discharged as cured, and the third is continuing treatment in another city, still showing marked improvement. The intestinal case was a very instructive one, illustrating well one of the points to be considered later. The patient was in the pyrexial stage, having fever and symptoms of a systemic intoxication. The opsonic index was considerably over unity. However, injections were started, with the idea of still further raising this. Under the treatment the patient grew rapidly worse, and after a time the injections were stopped. Improvement then took place for a couple of months, but the patient eventually succumbed. This was one of my first cases, and I feel that harm was done. The case of cystitis was markedly benefited. Before treatment the patient had to urinate about fourteen times each night, while now he urinates only twice each night, and his whole general condition has improved, and I confidently look for still further progress in his case. The cases of tuberculous cervical adenitis have certainly been most satisfactory, and the results obtained here have amply repaid me for the long time spent in the treatment and the perseverance and constant care which it necessitated. Six cases were treated and all were cured. One patient, in particular, had undergone four operations, and when she came for tuberculin treatment had another mass of enlarged glands and was markedly disfigured by the thickened, unsightly scars at the sites of the previous operations. Under a course of tuberculin the enlargements disappeared, so that the glands were no longer palpable and, what was quite surprising and the more agreeable, the scar tissue seemed to undergo a certain amount of absorption. This was about two years ago, and no recurrence has taken place and the patient is in good condition. In the light of my experience and that of others with such cases, where the condition has not advanced to the stage of caseation or of breaking down, operation is not justifiable, as careful attention to general hygienic conditions and the administration of tuberculin, the dose varying for each case, according to the calculated index and the clinical symptoms, will often suffice to save them from the mutilation of the often unsuccessful sur-

gical measures which are now resorted to. Even in cases of caseation and where breaking down is inevitable, a course of tuberculin preceding and following the operation will be of great benefit. The four cases of laryngitis were instructive. The first was primary in the larynx, that is, primary in that no other lesion could be made out. This case was fairly well advanced, but responded to the treatment and was cured. The second case had a demonstrable lung lesion in addition to the local lesion. Marked improvement took place, but the lack of proper facilities at home led me to recommend her removal to a tuberculosis sanitarium, where her improvement has gone on steadily. The other cases had, in addition to the local and lung involvement with tuberculosis, a secondary infection with streptococcus. Neither showed any improvement. Later, judging from the published reports of others, who have treated such cases with alternate injections of tuberculin and streptococcus vaccine, the results have been more satisfactory. The remaining cases of tuberculosis were all cases of eye infections. The case of iritis was interesting. A comparatively large, well circumscribed tumor mass was present on the anterior surface of the iris, and there was a question of diagnosis between syphilis and tuberculosis. The history was negative as to the former, and tuberculin was injected on two occasions, not for the purpose of treatment, but purely for diagnostic purposes. Much to my surprise, the mass began to get smaller, and under continued treatment by injection of tuberculin eventually disappeared. The other cases gave the cutaneous reaction to tuberculin, and in the case of tuberculous keratitis, although the case was not an early one, it quieted down under treatment. The cases of phlyctenular keratitis ceased to have the recurrent attacks which had previously been so frequent. The same is true of the case of episcleritis. These cases are now entirely free from these attacks.

The next series of cases comprises the staphylococcus infections. Here 47 cases were treated and, with one exception, all were cured. The list was made up as follows: General furunculosis, 9; acne, 2; carbuncle, 1; eczema of the auricle, 1; otitis externa diffusa, 3; otitis externa circumscripta, 21; otitis media suppurativa subacuta, 5; chronic tonsillitis, 3; peritonsillar abscess, 1; abscess of the septum, 1. The list may not appear very impressive at first glance, but these cases were all

chosen because of their known chronicity and comprised that class which ordinarily does not yield to the other well-known methods of treatment, infection after infection occurring. One case of acne was of fourteen years' duration, and every kind of treatment had been tried, time and time again, without relief. This patient has now been entirely free for over two years. The otitis externa cases were of that fairly numerous class, which is the despair of the otologist, attacks constantly recurring. All these yielded readily to treatment with the vaccine. Under the heading of subacute ear cases are placed that large class in which, after the acute infection has run its course, the suppuration continues and eventually becomes of the chronic type. Five such cases were treated. Three ceased discharging, after practically the first injection; in the fourth, the discharge became much less in amount, and then the patient ceased to report; the fifth was not benefited. This series was made up, as far as possible, of cases in which the pathologic lesion was confined to the mucous membrane, not having yet reached the bone; the reasons for this will be stated later. The eczema in question was a chronic one, situated around the auricle, with often recurring acute attacks being superimposed on the chronic condition. The organism was isolated from a pustule, present during one of these acute attacks, with very satisfactory results. The peritonsillar case was one in which the abscess had been evacuated by surgical measures some months before, but the suppuration continued, becoming of the chronic variety, the cavity filling up with pus, discharging and again refilling. Two injections sufficed to clear up this condition. The abscess of the septum was also of this variety, essentially subacute or chronic, but one injection of 500 million was thoroughly effectual. With regard to the tonsillitis cases, some doubts were entertained as to the outcome of the treatment, as, on account of the variety of the bacteria generally making up the flora in the tonsil, the causal one might not be isolated. In the three cases in question, however, the staphylococcus was found in such numbers that it was undoubtedly the causal one. These were cases of chronic tonsillitis, with several acute attacks occurring each year. The treatment here was eminently successful. The chronic or subacute condition cleared up, and during the last winter the patients were entirely free from the acute attacks, this being the first winter in years that they had escaped.

Seven cases of pure streptococcus infection are reported, five being cases of postscarlatinal suppurating ears and two of chronic dacriocystitis. Four of the ear cases ceased discharging after varying periods, the fifth remaining the same. Both cases of dacriocystitis were discharged cured.

The next subdivision comprises three cases of infection with the gonococcus, the first being a very obstinate case of gonorrheal arthritis, which had resisted all forms of treatment. Cure was obtained very rapidly here, although the patient himself had given up all hope of ever being well again. The second was a case of chronic gonorrhea; here from an examination of the case, it was decided that the staphylococcus was playing more than a passive part in keeping the condition active; accordingly alternate injections of the latter and of the gonococcus were used, with thoroughly satisfactory results. The third case was one of conjunctivitis, complicated by ulcerative keratitis; the progress of the disease was quickly arrested, and I think the involvement of the cornea was hence much less.

Only one infection with the pneumococcus was under treatment, a case of serpiginous ulcer of the cornea. In the scrapings from the cornea this organism was isolated in pure culture. This ulcer had been repeatedly curetted and cauterized to no avail, and then a vaccine was made. Immediately following the use of the vaccine the process started to subside and soon become quiescent. The treatment in this case certainly cut short the course of the disease and saved the balance of the cornea and, in all probability, the eye itself.

Friedländer's bacillus was found as the causal factor in three cases of chronic nasal catarrh. These were of that type in which constantly recurring acute exacerbations were added to the ever-present chronic condition. The improvement in all cases was marked; the chronic condition was much alleviated and the acute attacks could be easily aborted by one injection, given just as the attack was threatening. Here I have also placed three cases of chronic suppuration of the accessory cavities of the nose. These were of very long duration, years in all cases, and the organisms isolated were the bacillus of Friedländer, the streptococcus and the staphylococcus all being present in about equal numbers. As in the cases of chronic catarrh just mentioned, the first-named bacillus was

found as the causal factor, and as in many other nasal chambers examined this was found so constantly, it was arbitrarily assumed that this was the causal organism and that the other two organisms were accidental or secondary infections. Treatment was accordingly started on this assumption and pursued for some time. The nasal catarrh accompanying the sinus condition cleared up, just as in the cases of straight catarrh, but the sinus condition remained as before, and in the course of some few weeks or months the nasal chambers were reinfected from the sinus. These results, although rather unsatisfactory, are not discouraging, as very great relief was afforded for weeks at a time, and also because the test was a very rigid one, as will now be explained. In the first place, drainage was not secured by operation, and it was purposely endeavored to do without operation, trying to open up the natural passages according to the method of Wright, namely, irrigating the nose thoroughly and at frequent intervals with a solution of sodium citrate, to promote, if possible, the absorption of the occluding tissues. Nothing much was expected from this, but it was given a trial. Other reasons for failure lie in the fact that a very necessary, and, in fact, indispensable condition, may not have been complied with, that is, certainty as to the causal organism. In spite of these comparatively negative results I feel that under proper conditions, as to drainage and isolation of the proper pathogenic organism, this form of treatment will have a large share in the future in the treatment of such conditions.

The next series is also very instructive and interesting, but was not so disappointing, as favorable results were not really expected. It comprises seven cases of suppurating ears, in which the bacillus pyocyaneus was isolated, and which were treated with a vaccine of this, with negative results in all seven cases. Doubts were entertained from the start, on account of the well-known cultural and pathogenic characteristics of this bacillus, it being one of low pathogenic power, at least for man, generally existing as a parasite, not being the primary invading organism, but a secondary one. Moreover, this bacillus does not rightly belong to the class of organisms producing endotoxins, as the ordinary pyogenic bacteria do, but, on the other hand, it produces a soluble diffusible toxin, pyocyanin, which is easily visible to the naked eye in a culture a

few days old. Such an organism would probably therefore call for an antitoxin, like diphtheria, and not a vaccine. In spite of all these factors, however, as this bacillus has been found by others as the only organism in several fatal cases of septicemia, and as it is probably more often a primary factor than is thought, a vaccine was made in each case and used. The results were negative, as above stated. Having in view this fact, it was decided to displace, if possible, this bacillus and to replace it by another parasite of practically no pathogenic action and having no effect on the tissues, as suggested by Metchnikof and North. A series of cases are now being kept under observation and are being treated by a solution or culture of the bacillus *Bulgaricus*, commonly sold under the name of Massolin. The results, so far, have been very encouraging, but the number of cases treated is too small to judge from. Further reports of this investigation will be made in the near future by Dr. Haskin.

Two cases of rhinoscleroma, infection with the bacillus of Frisch, have been under treatment for the last two years or so, and one is still receiving injections. These are the cases reported last year by Dr. Guntzer and are the first to be treated in this way, so far as is known. Considering the disadvantages we were under in the treatment of these cases, having no precedent to guide us in the dosage and other factors, the results have been encouraging. Cure has not been effected, but the improvement has been marked, and the patients, instead of being confined as hospital cases, are able to pursue their ordinary vocations in life. One of the patients, in whom it was necessary to do a tracheotomy, has now gone for months without the tube, and his breathing is better than it has been in years. He left recently to take a position in a city in the West.

In comparison with the other methods of treatment recognized as applicable to this condition, such as extensive operation, the X-ray and the use of radium, I think the balance is in favor of the vaccine, if an opinion based on such a small number of cases treated has any value. However, in view of the poor results obtained by any kind of treatment in this slow, obstinate and comparatively unknown disease, and as the causal bacillus can be so easily grown, treatment by vaccine would seem to be thoroughly rational and would perhaps do

more, if our experience were larger. Since the treatment was begun the progress of the disease had been stopped in both cases.

There were three cases of infection with bacillus catarrhalis, and with these will be considered three other cases giving the same clinical symptoms, those of acute nasal catarrh, present in that class of patients who are always "catching cold." In the latter three the causal bacillus, although easily isolated, could not be classified by name. All cases yielded to treatment; the attacks became less frequent in number and severity, and when an attack threatened, an injection was efficacious in limiting the duration to less than one day. Some of these patients, who used to have a cold or series of colds every winter, have since been free.

Under the name of unknown species of bacteria I have grouped the last three in the series mentioned above, and in addition four cases of chronic suppurating ears and two cases of chronic dacriocystitis. In these cases, the organism isolated was undoubtedly the causal one, but did not fall under any species with which I am familiar. Three of the ear cases cleared up, but the fourth remained as before. The two cases of dacriocystitis were entirely cured.

This completes the list of cases treated. On the whole, I think the results were very satisfactory. It might here be said that all the ordinary methods of accepted or recognized treatment were used in conjunction with the vaccine treatment. Personal hygiene was rigidly insisted on, and in the ear cases local irrigations were kept up. However, in view of the fact that these methods of treatment had been given a thorough and exhaustive trial, in some cases extending over a period of years and in all cases at least for weeks, before the vaccine was used, the results obtained can be fairly attributed to the vaccine treatment.

Some stress was laid on the fact that the choice of ear cases was limited to those in which it was thought the lesion was limited to the mucous membrane. This was in reality a wholly unnecessary proceeding, being due entirely to personal reasons, as the time that could be devoted to this investigation was limited, and it was necessary to get quick results, because the majority of cases treated were outdoor cases, and as these patients cannot be expected to come over a long period of time,

as is invariably the case, they are one by one lost sight of. A few words might be said about that larger proportion of chronic suppurating ears, in which bone necrosis is probably present. Considering, in brief, the pathology presented to us in such an ear, we have progressive necrosis of bone up to the point at which the resisting powers of the body are strong enough to stop the advance of the necrosis, that is, we have a line of demarcation formed, just as in the death of the soft tissues or gangrene. The necrosed bone is a foreign body and must be removed. Nature eventually accomplishes this by a slow process of ulceration, taking months to remove it. If the mass is of considerable size, the surgeon can remove this in a few minutes, provided he can do a thorough operation, removing the bone not only macroscopically but microscopically diseased. A consideration of the radical operation shows that the majority of the results attained are not satisfactory, in many cases the suppuration continuing and the after-treatment lasting from at least a few months in the most favorable cases to a lifetime in others. Of course, there are certain cases that must and always will demand the radical operation, but lately the pendulum has swung back, and the radical operation is not being done on every case that presents itself. Any measure, therefore, that offers at least a chance of success ought to be given a trial. If the causal organism is isolated and the vaccine treatment tried, nature will be stimulated to form the line of demarcation. The time of treatment will extend over a long period, but even now all forms of treatment of this condition demand months of treatment. It is hoped that a further report on a series of such cases will be made as soon as a sufficient number have been observed.

✕ The Hiss extract of leucocytes was used in nine cases. This was in reality six cases, as the other three were cases that were not suitable to this form of treatment. Of the six cases, four recovered, and two died. It will be interesting to give in some detail the history of some of these.

It must be borne in mind that all these cases were ones in which all other measures of treatment had been exhausted, and as a last resort the extract was used, the surgeon in charge of the case feeling that it did not matter much what was done, as the case would terminate fatally. A severer test could not be devised, and the results were all the more encouraging be-

cause of this fact. The most satisfactory was a case of pansinusitis. G. H., age 9 years, was operated on, a frontal sinus operation being performed, the anterior ethmoidal cells being removed at the same time. For fifteen days following the operation, the temperature ranged between 98° and 105° F., as shown on the accompanying chart. A diagnosis of meningitis was made by Dr. Zabriskie, who found marked general hyperesthesia, deep muscular tenderness and a well-marked Kernig's sign. The smear from the frontal sinus showed mixed infection, with streptococcus predominating. Just before the extract was injected, the temperature was 104.4°, pulse 145, respiration 30. Within twenty-four hours the temperature fell to 100°, pulse to 90 and respirations to 25. The temperature then gradually returned to normal and recovery was uneventful.

The second case was one of mastoiditis and sinus thrombosis, with a general bacteremia, as shown by the blood culture, long chained streptococcus being found in the latter. The simple mastoid operation had been performed, and the patient had been discharged from the hospital and was attending the out-clinic. On one of the occasions on which he presented himself, he had some fever and was not feeling well. He was admitted to the hospital for observation, and after seven days, during which his temperature varied between 102° and 104°, a blood culture showed long chained streptococcus. Operation was immediately performed and a large clot was found in the lateral sinus. Free bleeding was obtained from the torcular end of the sinus, but rather poor from the jugular end. As the patient was in bad condition, an intravenous infusion having to be given on the table, it was decided not to take out the jugular. The temperature remained down for twenty-four hours, but at the expiration of this period again arose and assumed the septic type. The Hiss extract was then started, and the improvement in the general condition was immediately marked, although the effect on the temperature was not so noticeable. As soon, however, as visitors were forbidden entrance, the temperature returned promptly to normal. Here it may be noted that the jugular was not excised, the clot simply being cleaned out as thoroughly as possible.

The third case of this series was also one of mastoiditis, complicated by sinus thrombosis. At the time of operation, the

lateral sinus was found thrombosed and filled with a very foul-smelling pus. The jugular was accordingly excised. Following operation, the temperature gradually rose, each day's record being a little higher than the preceding day. Physical examination on the fifth day following operation revealed symptoms of early meningitis, the patient also being unconscious and delirious. Immediately following this examination the Hiss extract of leucocytes was given at regular intervals of twelve hours, and the improvement was marked from the very beginning of the treatment. The temperature gradually fell, and the great improvement in the general condition of the patient was most marked, the symptoms of the toxemia gradually disappeared, the delirium disappeared within a few hours, and the patient was perfectly rational in twenty-four hours. Three days after the beginning of the treatment the temperature had reached normal and thereafter the recovery was uneventful.

The fourth case was one of mastoiditis, complicated later by sinus thrombosis and lobar pneumonia and pleurisy. This was the first case to be treated by the extract, and the patient was in a practically moribund condition when the extract was given. The history is as follows, and the accompanying chart shows the course of the temperature: Four days after a minor nasal operation the patient developed an acute infection of the left middle ear, also mastoiditis and eventually came to operation, a simple mastoidectomy being done. Following operation the temperature was of the septic type, as shown on the accompanying chart, and on the fifth day the patient had a decided chill. The next day a second operation was decided on, and an exploratory incision in the lateral sinus showed the presence of a large clot. This was removed and the jugular vein excised. The temperature continued to be of the septic type, and on the second day following the last operation pneumonia and pleurisy developed. The patient was in extremis, and at this time the Hiss extract was given. Improvement was noted after the second dose, and although the extract was given at very irregular intervals convalescence was uninterrupted.

The next two cases are the ones that progressed to a fatal termination. The first was a child, one and one-half years old, and was operated on for acute mastoiditis, the usual simple mastoidectomy being done. The patient was in bad condition,

a large subperiosteal abscess being present. Temperature on admission was 101° ; immediate operation was done, and following the operation the temperature gradually rose, reaching 105° on the fourth day and 106.5° on the eighth day. The diagnosis was uncertain, as there were very few physical signs to go by. On this day, however, well marked opisthotonos was present, and a second operation was performed, the dura being found congested and bulging. This was incised, and the temporosphenoidal lobe probed in various directions. Immediately following the operation the Hiss extract was injected, and, although the case finally resulted fatally, the child lived for thirty-six hours, with a temperature of over 107° , something, I think, quite remarkable, considering the condition. On the day following the second operation, lumbar puncture revealed the presence of a small extracellular diplococcus in the spinal fluid. This was one of those obscure cases in which a diagnosis could not be made until late and, considering the remarkable vitality of the child, an early use of the extract might have accomplished something, just as in the first case reported.

The other fatal case was also of this type. A man 37 years of age was operated on for acute mastoiditis, and the usual simple operation was done. Following operation the temperature did not come down, but continued to rise gradually, reaching 105° , and symptoms of meningitis gradually developed, accompanied by repeated chills. Secondary operation was resorted to, and the sinus was found thrombosed and a well-marked meningitis, the dura of the middle fossa being injected and bulging. This was incised and a drain inserted in between the dura and brain tissue; the jugular was then excised. For the following two days the temperature fluctuated and gradually rose to 105° , pulse 154 and respirations 52. It was at this point, when the patient was taking the final change for the worse, that the extract was injected, but it was of no avail, and the patient succumbed in a couple of hours. This case is placed here because it was a suitable one for such treatment, but it is not a fair one to count for the extract, although in some of the other cases the condition seemed almost as hopeless. The other three cases, which were not suitable cases for this treatment, were the following: The first was a case of brain abscess, but the real cause of death was a very acute

parenchymatous nephritis with uremia, a disease altogether outside of the sphere of useful treatment by leucocyte extract. The second was a case of specific frontal sinusitis, on which multiple operations had been performed. Each of these cases received only one injection, when the nature of the lesion was recognized and treatment stopped. The third case was one in which the diagnosis was in doubt and was probably not an infection at all, but some intestinal disorder.

On the whole, therefore, I am more than satisfied as to the efficacy of the extract and am absolutely convinced that otherwise a fatal issue was inevitable in the above cases and that this was avoided by the extract. To get results in any disease treatment must be started early, especially in such a disease as meningitis, where such a delicate mechanism as the nervous system is attacked. Once it gains a firm hold, it is a hard matter to do anything.

A few words will not be out of place concerning the reliability of the opsonic index and its calculation. Lately some prominent authorities have reported that they found it unreliable, in not agreeing with the clinical symptoms and also in that the calculations taken from the same cases at the same time by different observers have differed quite markedly from each other. Granted that these statements are true, and they assuredly are true, in my experience, are they cogent reasons why we should condemn the opsonic index as unreliable and bring it into disfavor? Consider the practically parallel proceeding in making a blood count. Does the result of the blood count always agree with the clinical symptoms? Do any two men get the same results when blood counts are made on the same case under identical conditions? You can all answer the first question. Who among you has not had a case in which the clinical symptoms and the blood findings showed absolutely no correspondence, yet this fact did not induce you to condemn the blood count as utterly useless. You know that in the majority of cases it is reliable. The same is true about the opsonic index. Why, then, condemn this? The reason for failure in some cases, perhaps in the majority, is that it is mainly a question of the personal equation, that factor which we cannot get rid of. The results of a blood count lie practically in the hands of the one making it, and if he is conscientious and follows the technic his results are to be depended on,

but if he is not conscientious and looks upon this as an unwelcome piece of work, to be done with as soon as possible, then it were better for you that you had done without this aid to making a diagnosis. The same applies to urinalysis or any laboratory work. That is one of the reasons why I make the plea that this opsonic work be left in the hands of those who are capable of doing it. The chances of error in the calculation of the opsonic index are far greater than those in doing a blood count, as the technic is more complicated and, unless the smallest details are worked out and the whole technic is rigidly adhered to, the results will vary. The reason why Wright and his immediate followers got such satisfactory results was because they were scrupulous in this regard. The results of such an authority as Hektoen, in this country, ought to carry some weight. In a series of acute infections, independent calculations were made by himself and four others, under exactly the same conditions, and it was found that these calculations tallied, all showing the negative phase, and then the positive phase, and as the index rose the symptoms subsided. Hektoen further states that when properly and conscientiously performed, it is quite reliable in the majority of cases, and is, in fact, an indispensable aid. I have found it so in my experience.

I now come to the scientific side of the question and will briefly consider at the beginning some necessary facts that must be stated in order to understand what is to follow. The old ways of treating infections were tonic and supportive, obviously unsatisfactory, as they did not try to get at the cause of the disease. Now, by a study of nature's own methods of defense, as seen in infections artificially produced in animals, we endeavor to imitate her and to make use of the same weapons. This is the keystone of vaccine and serumtherapy; it is around this pivot that everything revolves. In any disease we have two factors to consider; on the one hand, the invading organisms; on the other, the resisting forces of the body. Analyzing shortly the first, we find that all bacteria do not act on the body in the same way, that, in fact, their methods of attack differ widely from each other. They all have a common action in the sense that they act mechanically, just like any other foreign body introduced into the body, that is, they act by their physical presence. This is a comparatively unimportant point, its only importance practically lying in the fact that

it may lead to embolism in the vessels. The vital ways in which the bacteria act may be divided practically into two classes. In the first class we have those bacteria which secrete soluble, diffusible bodies in the media in which they thrive, called toxins. These toxins are readily given up to the circulating fluids of the body, and it is through the agency of these toxins that the bacteria produce their baneful effects on the body. The second class, and this is the important one for us to consider, as to it belong the organisms which we have been considering above, comprises that class which elaborate within their own bodies a class of substances known as endotoxins. These endotoxins are retained within the bacteria elaborating them, not being given up to the culture media or the circulating fluids, but only being set free when the bacteria are dead or dying. It is probable that some species of bacteria act in both ways, by a soluble toxin and by an endotoxin. To this class the tubercle bacillus probably belongs, the active toxin being an endotoxin and the soluble one being an accessory one. It was to combat this latter, the soluble one, that Koch introduced his old tuberculin, and, since the real toxin is thought to be the endotoxin, the reasons for failure of the old tuberculin are apparent.

On the other hand, we have to consider Nature's ways of fighting these bacteria. When a foreign substance is introduced into the body, especially if that foreign substance is of an albuminous nature, the system, by the very presence of this material, is stimulated to the formation of what are known as antibodies, that is, bodies whose function it is to neutralize the effects of or destroy the substance introduced. Obviously these antibodies may be of many different varieties, depending on the character of the antigen calling for their formation. Applying this principle to the bacteria forming the soluble toxin, we will have the formation of an antitoxin. The examples of this class are perhaps the most familiar to us, diphtheria antitoxin and tetanus antitoxin being of this nature. Against the second class we would have the formation of bactericidal and bacteriolytic bodies, which would destroy and dissolve the bacteria, setting free the contained endotoxin. It is important to emphasize at this point that when the bacteria are destroyed and dissolved by the foregoing serums the endotoxin is not necessarily neutralized, in fact, is not generally so. This point

will again come up in the discussion of these serums. Lastly, under the heading of defense, we must consider an important factor, the phagocytes themselves. The question of the origin of the antibodies, whether they are derived from the phagocytes, as Metchnikoff holds, or from other sources, as other well-known investigators claim, is entirely outside the scope of this short paper, but whatever view we hold, we must all admit the great importance of the phagocytes themselves. Since the action of the opsonins is intimately bound up with that of the phagocytes, these will also be classed here. It may be well to define exactly what opsonins are. The name is from the Greek, and freely translated, means, "to prepare for eating," or "I prepare for eating." The opsonins are normally present in the blood serum, and, as the name implies, they act on the bacteria in some way, preparing them for ingestion by the phagocytes, that is, they prepare them so that the phagocytes can the more easily eat and digest them. Hence, indirectly, they act by stimulating the phagocytes and hence the placing of these two factors together.

Based on the preceding ways in which nature copes with infection, we have four classes of therapeutic agents, each one differing from the other in the fundamental, underlying principles of application. These four comprise the antitoxins, vaccines, bactericidal and bacteriolytic serums and the leucocyte extracts. It is not necessary to deal with the antitoxins, as their use is well known. The second class, the vaccines, are one of the important subdivisions to be dealt with at some length. By the use of vaccines, either attenuated cultures of the living bacteria or, as is now more often the case, killed cultures, we aim to stimulate the body to increase its formation of antibodies and thus to overcome the infection. The point to be emphasized here is that the body itself must form its own antibodies, that is, an active immunity must be brought about. The significance and great importance of this statement lies in the fact that it takes some time for this immunity to be developed; it is not a matter of hours or of a day, but several days, generally three to four at least, and sometimes much longer. During this period, in which the antibodies are being formed and consequently immunity is being developed, it is a well-established fact that the resisting powers of the body are not only not increased, but are actually diminished

in the large majority of cases. This is the so-called negative phase and is a very important factor to be remembered. This phase can easily be shown on the chart of an opsonic curve, where, following an injection, we have a decided fall in the curve and, after a varying period, depending on the dose and other factors, a rise to a point higher than the previous reading. A practical, everyday example, probably not an exactly parallel one, is the Widal reaction in typhoid fever. Here we do not get the agglutinating action of the serum, the evidence of antibody formation, for several days after the clinical symptoms of the fever have appeared; when reaction has well set in, we get it. I will illustrate this point further by reverting to the case of intestinal tuberculosis which ended fatally. This case was running a temperature of about 101° F., and all the symptoms of a systemic intoxication were present. This case was decidedly not a suitable case for such treatment. Take, for example, a systemic acute infection, such as a case of acute septicemia, in which we have high temperature and all the symptoms of a grave constitutional intoxication. If it were put to a vote of clinicians as to whether they would use a vaccine in such a case, I have no doubt whatever that many might favor such a course, and yet nothing is more illogical and nothing could be more harmful. Consider the state of affairs present in just such a case; interpret the symptoms. The train of symptoms or the bacteremia is simply the way the body has of showing that it is being hard pressed, and as the symptoms increase in severity the lines of defense are being broken down; that it is being defeated in the struggle, that its poor, worn out, jaded cells have exhausted their powers of antibody formation. How unfortunate, then, to use a vaccine in such a case, calling upon the cells to form more antibodies when they are already exhausted. Following this injection for several days, we find the body more open to infection, it being in the condition spoken of above as the negative phase. Yet this is being done every day, especially in the treatment of tuberculous patients, simply by the clinician not knowing or not realizing the nonsuitability of the case for this treatment. It is an absolutely different consideration, when the case is subacute or chronic. Here a rational and closely watched course of treatment with the vaccine is of almost specific value in some cases. The above considerations apply to constitu-

tionally acute cases, in contradistinction to the locally acute cases, as these latter were the classes of cases that were markedly benefited.

The next point in a consideration of vaccines is the kind of vaccine to be used, that is, whether autogenous, that cultivated from the patient, or a stock vaccine. To my mind, there are no two sides to this question, as in all cases it should be an autogenous vaccine, although I have used the stock one in some few cases. The vaccine, as explained above, stimulates the formation of antibodies and opsonins, and so far experience seems to show that these antibodies and opsonins are specific, that is, that a certain bacterium will give rise to a certain antibody or a certain opsonin, and that antibody or opsonin will be effectual against that bacterium and against that alone. It is easy to see, then, why we should use an autogenous vaccine. The stock vaccines are made up of mixtures of different strains of bacteria of the same or allied species. If a strain of the particular offending organism is present, we may get results, but if it is not present, then the specific antibody or the opsonin is not stimulated to formation, and no good results from its use. The system, with a stock vaccine, is called upon to form a whole series of antibodies, corresponding to the varieties introduced, and these have no function to fulfill, as there are no corresponding bacteria to oppose, so that the energy of the system is spent in useless work. The energy is not a trifling force, to be thus dissipated. This observation applies to all stock vaccines, but especially to vaccines of bacteria, such as the staphylococcus and the streptococcus. When we consider the multiplicity of forms of such bacteria, it is easy to see why stock vaccines fail in some cases, in which the results with autogenous vaccines have been so brilliant. We are all familiar with the many varieties of streptococcus, differing as they do so little in morphology and staining properties, and, what is more important, so much in their pathogenic action. In some work in which I am now engaged, in classifying the various bacteria found in the tonsils, one is at once impressed by the many varieties of streptococcus isolated. When we consider the staphylococcus, the same holds true. We see differences in pathogenicity, pigment formation, liquefaction of gelatin and their cultural characteristics in general. These are but examples; the list is almost endless. Thus we can understand

that in a given case, unless the invading organism forms one of the strains in a stock vaccine, probably no effect is produced. Again, why do we need stock vaccines at all? Needless to say, the microbial cause of a disease must be known before a rational attempt can be made to treat with a vaccine. If we can get enough of the discharge to make a bacteriologic examination, we can at the same time make cultures and prepare a vaccine. In the above series of cases a stock vaccine was used in treating some of the cases of tubercle infection, on account of the difficulty of preparing this vaccine, but just as soon as possible, an autogenous vaccine was substituted; also, in one case of tubercular adenitis, which did not improve under the human tuberculin, bovine tuberculin was substituted and this was of necessity nonautogenous. The gonococcus is rather hard to prepare as a vaccine, on account of the fastidiousness of this bacterium, which grows only on special media and quickly dies out. As there are probably few varieties, the results with the stock vaccine have been rather good, but in all cases it is better to use the autogenous one. The stock ones may not be fresh, and this is quite an important point, as, even with autogenous ones, it is better to make new vaccines every few weeks.

The third class of agents comprise the bactericidal and bacteriolytic serums. For the production of these, just as in the formation or preparation of antitoxin, we immunize animals, such as the horse, against the pathogenic organism. The serum of such animals is now used for injection into patients suffering from infection with that organism; in other words, we get the cells of the animal to manufacture the antibodies and then use these bodies, ready made, so to speak, for injection into patients. Thus, in this class, it is a passive acquired immunity that is brought about, the cells of the patient taking no part in the process. This would be an ideal condition of affairs, supplying the body with its weapons ready for use, but unfortunately the practical results have not been encouraging. Mainly for this reason and also because the theoretic considerations are, on the whole, opposed to such serums, I have not used them. One point, and this seems to be more than theoretically established, is the fact that a bactericidal serum is not necessarily and in fact is not generally antiendotoxic; that is, that, although the bacteria are killed, the contained

endotoxin is not neutralized but is actually set free as a poisonous body having free rein to act injuriously on the body. Therefore, when an injection of such a serum is given, so much endotoxin may be set free that the body succumbs to the severity of the infection. The question of anaphylaxis also comes into question here. The action of such serums may be utilized either as prophylactics or as curative agents. The first does not interest us practically, as most of our cases are well advanced when we are called to treat them, and hence are not subjects for prophylactic measures, and as curative agents they have proven failures. Lately, the so-called polyvalent serum against streptococcus infections is being again brought into use. This is made by immunizing suitable animals against a number of strains of streptococcus and using the serum of such animals in man. Now, in the immunity developed after a streptococcus infection, the serum does not possess any marked bactericidal or antitoxic properties, but rather acts by stimulating phagocytosis or more probably by supplying opsonins. Many have claimed that it has not only protective properties but also curative ones. It probably has some action in supplying opsonins, but it is open to all the objections cited against bactericidal serums in general and in addition lacks one very necessary quality, that of specificity, it really being on the order of the old gunshot prescription, empiricism as opposed to rationalism.

The next subdivision deals with the leucocyte extracts and the rationale of the Hiss extract is based on the all importance of the leucocytes in the struggle against infection. If we consider the phenomena presented to us in inflammation, we are at once impressed by the important role which the leucocytes assume and their importance in the fight waged against the invading army. Soon after the infection is set up, we have a vast army of leucocytes or, as they are now better known, phagocytes, hurrying to the point of attack and actively combating the bacteria. This is true of the infections in general, and especially so in the infections which we are ordinarily called upon to treat. In the struggle that ensues many of the phagocytes are killed, others are maimed or injured and all are more or less worn out. If the bacteria are the stronger the body is overwhelmed; if the phagocytes, the infection is overcome and the body returns to the normal. All the differ-

ent leucocytes are not equally important, the main ones concerned in the majority of infections being the polynuclear neutrophiles and the large mononuclear leucocytes. It follows then logically from the above, that if we can assist or strengthen the leucocytes in any way, we will at the same time enhance the chances of the body overcoming the infection. Hiss divides the protecting factors involved into two classes; in the first he places the antibodies, such as the agglutinins, lysins, opsonins, etc. These are readily produced by the cells and given up to the circulating fluids of the body. In the second class he placed the endobodies of the leucocytes. He assumes that these endobodies are present in the bodies of the leucocytes elaborating them and are not, as a rule, given up to the circulating fluids, as the first set were, but are retained in the bodies of the phagocytes manufacturing them, serving to protect them, and, in this indirect way, also protecting the more highly specialized cells. Therefore, if we furnish to the phagocytes the bodies of which they are deprived in the fight, that is, furnish them quickly and directly with their weapons of warfare, they would be the better protected from destruction and would be in better condition to carry on their work of ingesting the bacteria and would the better be able to recuperate quickly. With this end in view, Hiss proceeded to make an extract of rabbit's leucocytes, hoping that it would contain the above bodies and that by the injection of this extract into patients the victims of infections, the phagocytes would thus be strengthened. For several reasons, preference was given to extracts rather than to the intact leucocytes, as the former are the more diffusible and would thus be carried very quickly to the affected parts, protecting not only the leucocytes, but also the more highly specialized cells. Also, bearing in mind the probable specificity of opsonins, the intact leucocytes of a foreign animal, such as the rabbit, may not find in the serum of man the necessary opsonins for their stimulation and activation, or the opsonins may be depleted by the disease. Moreover, experiments were carried out with such leucocytes with practically no results. An extract is independent of these considerations. The results of experiments in animals, and of treatment of infections in man, has apparently borne out the truth of this assumption. Analyzing the results, it would seem that this extract does not act through any bactericidal, bacteriolytic

or phagocytosis-stimulating power, but that its very marked favorable influence on the temperature, and especially on the general condition, is in all probability referable to its neutralization of the toxic products, that is, ordinarily speaking, to its action in combating the condition which we describe as sepsis or toxemia.

Such being the principles on which it acts, we can see the advantages of such an extract. In the first place, we inject only substances which are normally present in the body. The reaction, therefore, following the injection, is practically negligible, only a very slight reaction being present in some cases, and these were few. Secondly, the body is not called upon to expend any of its energy in the developing of an immunity, that is, to form antibodies. This is an important factor, as was shown in the discussion of vaccines. Another factor, and this is probably the most important one, is that the effects of the extract are immediately felt, within a few minutes after injection, or at most within a few hours. The advantage of this in an acute case is apparent. Although given in doses of 10 cc., it is very quickly absorbed. There are some few disadvantages. We have no methods of standardizing, and of necessity, therefore, the extracts, made at different times and from different animals, must vary. This objection does not amount to anything practically, as the bodies in the extract are normally present in the body, and an increase does not do any harm, the excess being all to the good. Again, we are at sea regarding the length of time of its action, and also the proper dose. These also are not important practically, as we can guard our injections by the clinical symptoms. Some of the other great advantages are that we do not have to isolate the offending organism, as the action of this extract is absolutely independent of the bacteria, depending only on the resisting powers of the body. The great importance of this statement will be appreciated when the treatment of some of those obscure cases of sepsis comes up, in which the causal factor cannot be isolated, but which are surely due to some invading organism, or, in cases of mixed infection, when we are in doubt as to the primary organism, as in the meningitis case reported.

Incidentally, I might here mention that Dr. Adrian Lambert reported recently a series of cases which interests us, as we occasionally have to deal with erysipelas, complicating mas-

toid and other operations. He reports 51 cases of erysipelas of all kinds, treated on his service at Bellevue Hospital with the Hiss extract. In cases so treated within forty-eight hours of the onset, the extract acts almost like a specific, the temperature dropping almost to normal, the attack being thus cut short. In all cases the symptoms were much alleviated, temperature lowered, nausea and vomiting stopped and the complications and sequelæ were of much less frequency. In cases treated late, the succeeding septicemia was in many cases aborted. Some interesting statistics are furnished in cases of erysipelas in infants under one year of age. Before the use of the serum, his mortality rate was 100%. Out of six cases treated with the extract, four survived, or over 66%, a great difference surely.

Briefly recapitulated, then, the conclusions to be deduced from my own work are these:

1. In acute constitutional diseases, such as pyemia, septicemia and sapremia, the vaccines are contraindicated. In such cases, the leucocyte extract finds its greatest field of usefulness and will often save cases which are apparently hopeless. Some authorities do use vaccines in such cases, with the admonition to avoid the negative phase by proper dosage and very guarded administration. This sounds easy, but it is an entirely different matter to apply such to a case. Therefore use the extract of leucocytes in such cases and avoid vaccines calling for active immunization.

2. In the locally acute, without systemic symptoms, subacute and chronic cases, the vaccines find their greatest field of usefulness and will be found to act almost as specifics. I have had no experience with the leucocyte extracts in such cases, but they should be effective, especially in the subacute and the locally acute and certain types of chronic cases, in which the diseased focus is not walled off by a firm, hard, fibrous wall. However, the results have been so good with the vaccines that I have not felt the necessity of using any other agent.

3. In all cases use autogenous vaccines in preference to stock ones, as the results will be better and surer, and the administrator knows exactly what he is administering.

4. Make fresh vaccines frequently, so as to ensure their greatest potency.

5. Be guided in the administration by the clinical symptoms,

but at the same time do not neglect to calculate the opsonic index. In the majority of cases it is just as reliable as a blood count is.

6. Do not use tuberculin in tuberculosis when general constitutional symptoms are present, that is, when the patient is in the pyrexial stage. First, localize the process as much as possible, and then start the treatment, interrupting it if the condition again becomes general.

7. Give small doses often repeated, rather than large doses seldom repeated. In all cases start in with a minimal dose and then increase it.

8. Always have in view, even in the simplest case, the danger of anaphylaxis or hypersensitization. This is no negligible quantity.

9. Always combine with the vaccine treatment the other general medicinal and hygienic measures. This vaccine therapy is not a cure-all.

10. If you have a case of septicemia, such as that which follows sinus thrombosis, and your surgical measures have been exhausted, do not wait until the patient is in extremis or moribund, but start the use of the extract early, so as to give your patient the best chance. The extract is not a miracle worker. Most of the cases of the series reported to-night were very far gone and were really in the final stage. A more severe test of the efficacy of an agent would not have been devised.

Serum and vaccine therapy do not comprise agents which can be doled out by a certain dose, such as a general medicine, but it absolutely demands, for its intelligent administration, a certain degree of knowledge and skill which cannot be acquired outside of a laboratory. Also, out of justice to the patient, who in good faith trusts himself for treatment into our hands, fair play demands that we should do our best by him. Hence the average man, unskilled in this way, should recognize his limitations and avoid the possibility of doing harm and of bringing such an important therapeutic measure into disrepute. On the other hand, these agents should be given a fair trial and should no longer be neglected, as they have been in the past, by the specialist in his special fields.

In conclusion, I wish to state that the major part of this work was carried on in the laboratory of the Manhattan Eye, Ear and Throat Hospital, New York City, and in this connection I

wish to express my appreciation of the many kindnesses of Dr. Jonathan Wright, the director of the laboratory and instigator of this line of investigation; of Dr. E. G. Zabriskie, the pathologist, and of Mr. S. Richardson, the laboratory assistant. I also wish to extend my thanks to the surgeons and assistant surgeons of the above institution, who gave me the opportunities of treating their cases. My sincere thanks are also due to Drs. W. T. Connell and William Gibson, of Queen's Medical College, Kingston, Canada, my Alma Mater, who instructed me in the technical methods of vaccine preparation, and the latter of whom placed his case records at my disposal for reference. Dr. J. H. Guntzer was a co-worker with me, especially on the cases of rhinoscleroma, and my thanks are also due to him. To Dr. Philip Hanson Hiss, Jr., professor of bacteriology in the College of Physicians and Surgeons, Columbia University, New York, my sincere thanks are hereby extended for his uniform kindness and courtesy to me during the investigation and treatment of the series of cases with his leucocyte extract. Lastly, I wish to express, as far as words will allow, my keen appreciation of the many kindnesses of my associate, Dr. William Henry Haskin, whose kindly sympathy and encouragement provided a constant stimulus to me in the prosecution and continuance of this work and in the preparation of this report.

11 East 48th Street.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOTOLOGY.

Meeting of November 12, 1909.

DR. ROBERT LEWIS, CHAIRMAN.

PRESENTATION OF PATIENTS.

A Case of Sinus Thrombosis With Some Unusual Features.

DR. SEYMOUR OPPENHEIMER. J. G., aged 14, was admitted to the medical service of Mt. Sinai Hospital, May 31, 1909, with the following history: Two months ago had pain in the left ear; the drum membrane was incised, and a discharge took place, which persisted for four weeks. Since then has had severe occipital headaches. Following the cessation of the discharge, there was some temperature, and the patient felt chilly; at times distinct chills, followed by sweating. The chills occurred at very irregular intervals, sometimes as frequently as five a day, or again skipping a day. Vomiting nearly every day. For the last few days, pains in the joints of the middle finger of the left hand and severe pains in the left hip. Slight stiffness of the neck. Ocular examination showed the veins tortuous and a blurring of the edges of the disks—a beginning optic neuritis. The patient was much emaciated. Slight prominence behind the jaw of the left side, beneath the tip of the mastoid; no mastoid tenderness, nor any tenderness along the course of the neck; no discharge from the ear, but the drum membrane was dull and thickened; the canal wall possibly slightly infiltrated. A soft flowing pulmonic murmur is present. Cervical and axillary glands enlarged; liver enlarged. Metacarpal phalangeal articulation of the third finger tender and swollen. Motion of the limb causes pain in the left hip. Temperature 101.5° , having fluctuated only within a degree since admission. White blood count, 21,000; polynuclear count, 76 per cent. Patient regarded in the medical service as a typhoid suspect.

June 1st. Blood culture; large quantities of streptococci present. Following the report of the blood culture, patient was transferred to the ear service.

June 2nd. In view of the significance of the positive blood culture, and the previous history of otitic disease, the mastoid process was opened and the sigmoid sinus exposed. Small quantities of granulation tissue were found in the mastoid, the process being pneumatic in structure. The routine operation was performed. On opening the cells posteriorly some pus escaped from a perisinus abscess, the sinus being placed rather far forward and superficial. The contents of the sinus consisted of a broken down purulent thrombus, apparently not of recent origin. This thrombus extended almost to the torcular, necessitating the removal of a large area of bone in that direction, in order to establish free bleeding. The external wall of the sinus was entirely removed; the bulbar end of the sinus contained a purulent thrombus, which was cleansed out and a catheter drain inserted. The jugular vein was ligated and exsected prior to the manipulations upon the sigmoid sinus. The distal end of the jugular vein was brought out into the neck wound, and a catheter drain inserted here as well. The condition of the patient was very grave upon the operating table, necessitating intravenous infusion. For a week following the operation the temperatures remained very high, and there was a development of metastatic processes in the left hip, shoulder joint, and finger, which, under appropriate treatment, subsided. Recovery from this time on was uneventful.

Culture of the pus from the sinus showed streptococci as well as the tissue of the vessel wall and the thrombus itself. Blood culture taken the day after the operation was negative. The interesting features of the case are the development of an acute tympanic process, which apparently cleared up in the middle ear and yet was invading the sigmoid sinus. This case shows again the importance of the positive blood culture in otitic disease, for although the patient showed the symptoms of a marked septic process prior to admission to the hospital, the medical attendants in no way regarded it as associated with the aural disease, in view of the absence of discharge from the ear.

DR. RAE inquired whether he was correct in understanding Dr. Oppenheimer to say that it was the routine treatment in Mt. Sinai Hospital to ligate the jugular before doing the mastoid operation.

DR. OPPENHEIMER replied that in about 90% of the cases

that showed a positive blood culture, where it was not done primarily, it was found necessary subsequently, and it is now his custom to perform it primarily, where the previous clinical history has been of some duration and of much severity, and where metastatic signs are present.

DR. RAE could not approve of the wisdom of this proceeding. The records of the Manhattan Eye, Ear and Throat Hospital showed several cases in which the blood culture was positive, but in which the clinical evidence of sinus thrombosis was absent, and which went on to perfect recovery after simple mastoid operation.

In addition, a positive blood culture does not necessarily indicate the presence of an occluding clot in the sinus. A limited number of these cases recover after opening the sinus and removing a parietal clot.

Lastly it will not be denied that profound shock follows the ligation and resection of the jugular. It therefore seems extremely injudicious to first ligate the jugular and then prolong the anesthesia while the mastoid operation is performed.

For these and other reasons, Dr. Rae is of opinion that, even with all the clinical evidence of sinus thrombosis, including a positive blood culture, it is fairer to the patient first to perform the mastoid operation, satisfy ourselves as to the nature of the contents of the sinus by opening it, proceed to the resection of the jugular, if necessary, and lastly, return to the sinus, clean out the bulb end and obtain hemorrhage by removal of clot in the direction of the torcular.

Epithelioma of the Ear Successfully Treated by the X-Ray.

DR. F. M. LAW. The patient, a man seventy years of age, came into Dr. McKernon's clinic at the Manhattan Eye, Ear and Throat Hospital August 20, 1909, and was referred to the X-ray Department for treatment. In January he first noticed a pimple on the cheek, just in front of the ear, which grew rapidly in size and was very painful; he could not sleep on that side. In July the ear commenced to discharge. When he entered the hospital the ulcer extended from around the auditory canal out on to the cheek, one and a half inches, and from upper to lower border of auricle; had a bleeding surface and was markedly indurated. The canal was almost occluded, being only about the size of a pin, and a profuse discharge was

coming from it. To the probe the canal seemed to be lined with soft granulations. A section was sent to the laboratory for examination, and a report returned by Dr. Wright with a diagnosis of epithelioma.

The case was treated with the X-ray for ten minutes at a time, three times a week, with a tube of moderate penetration. Treatment was continued until September 25th, when there was a slight reaction, and treatment was discontinued, patient having had sixteen treatments. The ulcer was then smaller, the bleeding had stopped, and there was less induration. Treatment stopped for three weeks. Returned October 16. The ulcer was then the size of a quarter of a dollar, the pain had disappeared, he could sleep on that side, the induration was entirely gone, and the ulcer had a smooth, healthier appearance. The treatment was continued, three times a week. October 23, no discharge was visible; the canal had assumed almost a normal size. On November 5th he was sent to the ear department for examination. The walls of the canal encroached upon each other, and made a view of the drum impossible, but there were no granulations and practically no discharge. November 12, there was a normal sized canal, no discharge, and the ulcer had entirely disappeared. Patient has had 28 treatments. The interesting points in this case are the cessation of the discharge and the enlargement of the auditory canal.

Automatic Middle Ear Inflator.

DR. E. P. FOWLER. This little apparatus was presented before the American Medical Association last spring. The idea was to give the patients something which they could use at home to supplement the surgeon's treatment. The ordinary treatment for chronic catarrhal deafness with retraction of the drum membrane loses much of its effectiveness because of its irregularity and infrequency. If the patient is provided with a Politzer bag he is apt to use it too forcibly or too frequently, and he is liable to do more harm than good. This little apparatus gives the patient a definite pressure in the nasopharynx; no matter how much the balloons are inflated, the pressure remains the same, and this is governed by the laws of physics. The apparatus is very simple. There is a nose-piece, which fits into one nostril, and a valve to allow the exhalation to inflate the balloon easily, but which then closes,

so that the air comes back gradually into the nose. After inflating the balloon, the other nostril being closed during this procedure, the patient swallows and repeats this act until the balloon has collapsed. During deglutition the eustachian tubes are opened, and both middle ears are inflated.

The apparatus is made in two sizes, 10 and 20 mm. pressure. You cannot get any more in these sizes. The apparatus is of no use until the treatment has progressed to a point where the pressures obtainable with this instrument are sufficient to force air into the tubes during deglutition.

Improved Ear Trumpet.

DR. D. B. DELAVAN exhibited a new and improved ear trumpet made by Mayer and Melzer of London. It is similar in appearance to the flexible hearing tube in common use, excepting that the tube is smaller in diameter, and in its interior there is a spiral wire; at the end of this and near the base of the bell-shaped end of the tube is a small vibrating disk, which appears to be attached to the wire spiral. The object of the apparatus was to overcome the unpleasant overtones common in the ordinary instruments used to aid hearing. In conversation with a number of otologists in England, Dr. Delavan was assured that this instrument was a distinct improvement upon the old-fashioned models. It was an entirely new thing to him, and he thought that it might prove interesting to the members. The testimony in its favor was too good to be ignored.

In reply to an enquiry as to whether it could be obtained in this country, Dr. Delavan said that so far as he was able to learn, none of the instrument makers here knew of it. It had recently been presented by Mayer and Melzer. The objectional overtones form a serious blemish to many of the best forms of apparatus for the aid of hearing. This instrument not only makes the sounds more agreeable, but it protects the ear from the effects of unpleasant overtones. It is not an expensive article.

Paper: Latest Advances in the Study and Treatment of Tinnitus Aurium.*

By D. BRYSON DELAVAN, M. D.,

NEW YORK.

DISCUSSION.

DR. BRYANT said that he did not know of any disease of the ear which might not be accompanied by tinnitus, and that it could not advantageously be treated as a distinct disease, but rather as a symptom, just as pain is treated as a symptom. Tinnitus is controllable, as is pain, by powerful hypnotics. Treatment of tinnitus consists of treatment of the underlying disease. Whatever treatment improves the condition of the ear will improve the tinnitus. Sometimes the effects of tinnitus become of such importance that it is desirable to get rid of it at any sacrifice. In such cases, where the aural disease will not yield, the most positive help is the surgical removal of the peripheral hearing organ, or better, the severance of its central nervous connection. Except in the cases where destruction of the hearing organ is demanded, there are no methods of treating the tinnitus separately from the underlying disease. When the condition of the ear has been improved the deafness has, in some cases, improved before the tinnitus, and, in some cases, the tinnitus has improved before the deafness.

DR. CHAMBERS told of a case which he has had under treatment for a dozen years. The patient's ear is all right, the hearing is all right, but the tinnitus is such that at times the patient is so distracted and tormented that life is unbearable, and her sleep and health are interfered with. Immediately on going off for a journey the tinnitus disappears, and she will have no trouble until she returns. The patient is a woman seventy years of age, and has everything that money can give. While she is traveling the tinnitus will leave her for months at a time, and she will have no trouble until she returns home. Her suffering is very great. There is a condition of nephritis in the case. She has been put on all the medicines, hydrobromic acid, etc., but the condition is such that what will benefit the nephritis will have no effect upon the tinnitus.

*See page 173, March Annals.

In response to a question from Dr. Laws as to whether the nephritis seemed to have any bearing upon the tinnitus, Dr. Chambers replied in the negative. It appeared to be simply an accidental coincidence in the same individual.

DR. FOWLER said that two or three years ago, while experimenting with Bier's hyperemia, he noticed some interesting points in regard to tinnitus. It seemed often to bear no relation to the blood pressure or to the anemia. Sometimes anemic cases seemed to be much benefited. Two or three dozen cases were materially benefited by the constriction band, which they wore every night. One man had not slept for some weeks on account of tinnitus, and the very first night that he wore the neck band he slept comfortably, and did so whenever he wore the band. Whether this was due to the mental effect or to the constrictive effect of the band bringing the blood to the head, he could not say.

In reply to an inquiry as to whether this was a case of pulsating tinnitus, Dr. Fowler said that he did not remember. The man was 50 years of age and was not a neurasthenic. The matter was discussed in the clinic, and the man was told that it was imagination, and was told to leave off the band, but he returned and said that he had to put it on or he could not sleep. He claimed that it stopped the tinnitus and he was therefore able to sleep.

The only way to tell if the constriction neck band would or would not be of benefit, was to try it. In many cases it made the tinnitus worse, while in many it would have no effect on the noises in the ears, but nevertheless would produce restful sleep. Some of Dr. Fowler's patients have been using this band continuously for nearly two years and cannot sleep without it.

DR. HAYS said that among minor operative measures, Dr. Emerson, in the *ANNALS OF OTOTOLOGY*, September, 1907, and Dr. J. W. Jervey, in the *Medical Record*, September 18th, 1909, reported very good results from freeing the adhesions in the fossa of Rosenmuller in cases of tinnitus. He himself had found in a series of cases studied by means of the pharyngoscope, that if the adhesions were broken down and prevented from reforming, by the insertion of a piece of Cargile membrane, very good results were obtained. Replying to a query from the chairman as to how it was done, Dr. Hays said he

inserted the membrane with a probe, passed through the nose, or by placing a piece of the membrane on the finger and passing it through the mouth, and that oftentimes it would stay in place for one to two days. If this were done for a week the adhesions would not form again. In a few cases he had tried strong silver nitrate solutions, but the adhesions had a tendency to reform, as it was a difficult matter to place an applicator deeply into the fossa, even under direct vision.

DR. DUEL said that in reading the report of the meeting at Belfast, which Dr. Delavan had just summarized, he was surprised to see that otologists should still be talking about tinnitus aurium as a disease and not as a symptom—as Dr. Bryant had just said, which is the only rational view to take of tinnitus. It can only be a discussion of a part of the disease, and the only rational view of the treatment is in connection with the treatment of the disease itself. There are two very distinct types of tinnitus aurium; one, a type which is due to conditions in the middle ear, and the other, due to conditions in the labyrinth. We know perfectly well that a number of cases of tinnitus are associated with the middle ear. These are likely to be the low-pitched sounds, and which are pulsating in character. These are the types which can be benefited by treating the middle ear. The high-pitched continuous tinnitus, which accompany diseases of the labyrinth, are the types which are not influenced by local treatment. Personally, he had not succeeded with any constitutional treatment, excepting sometimes with large doses of bromide, when the patient was in a state of nervous depression, until they could get hold of themselves again. Many types of middle-ear tinnitus are permanently cured by removal of the cause—for instance, removal of obstruction in the eustachian tube is frequently followed by a disappearance of the tinnitus. The types which come on with acute middle-ear conditions of the inflammatory type usually disappear with the disappearance of the condition. The labyrinthine type of high-pitched continuous sound is strongly influenced in many instances by electricity, but not permanently. In his earlier experiments with the galvanic current in electrolysis, in the treatment of the eustachian tube, he had a patient who shouted at the top of his voice whenever he came into the office, and it was impossible for him to talk at all unless he spoke at that pitch. He was in the position

of men at Niagara Falls, who shout at each other in order to hear themselves. He had read this article, and having the apparatus he placed the negative electrode on the man's hand and the positive back of his ear, and the tinnitus was immediately diminished so that he could speak in a normal tone of voice, and he could also hear better. As soon, however, as the electrode was removed the man again began to shout. The man was so delighted that he could talk in a normal tone of voice when the current was on, that Dr. Duel rigged up a little apparatus somewhat similar to that worn by the telephone operators, with a small battery, which the man carried in his pocket. By putting his hand in the pocket and making the connection, he could hear when he was spoken to and could talk in a normal tone of voice. In this instance the condition was a labyrinthine tinnitus, which was temporarily influenced by increasing the pitch. Most of these cases are probably due to the hearing of one's own blood current circulating in the blood vessels, like water running through a pipe; you can turn on a certain amount of stream without noticing it, but if you increase that you can hear it. It seems probable that labyrinthine tinnitus is due to some change in the blood vessels. The idea of treating this condition by local massage, which does not alter the blood current, would be absurd. Middle-ear cases, however, can be cured by removing the cause of the obstruction.

DR. MYLES expressed his thanks to Dr. Delavan for bringing up this subject of "the symptom of nearly all diseases of the ear." For many years he himself has been experimenting on many forms of tinnitus aurium, and of course all have many cases which have been cured, some of them rather easily. It seems to him that tinnitus aurium is usually due to some circulatory disturbance, or to some mechanical disturbance of the middle ear or labyrinthine apparatus. The vasomotor nerves in many instances are affected. In 1897 he had published a paper on adhesions of the eustachian tubes to the membranes of the vault of the rhinopharynx.

For many years he has been removing these adhesions and cleaning out the fossæ of Rosenmüller, and in some cases obtained very good results, but not in all. He has also seen cases relieved or improved by the removal of certain deep faucial tonsils; in other cases—such as the so-called gouty con-

dition due to toxemia, causing a deposit from the blood in the labyrinthine structure, as in the joints and in other parts of the body—if the patient is properly treated by the best modern methods, having the colon properly cared for, with proper diet, exercise and other regimen for restoring him to better health, especially when the arteries are becoming more or less hardened, etc., great benefit has been obtained.

In nearly all cases the tinnitus has been stopped for ten to thirty seconds by a very careful pneumatic massage of the tympanic membrane. This favors the theory of circulatory causes.

DR. HURD said that he would like to refer to one point in regard to tinnitus in the early stage of middle-ear catarrh, when it is beginning to go up the tube, with very slight deafness and noise in the ear. In these cases very often the inferior turbinate has quite a little to do with the trouble, and the removal of the lower portion of the turbinate will help the condition. In some cases the velum is pulled back against the postpharyngeal wall and the tensor and levator palati muscles are not functioning normally, and by simply putting in the finger and moderately stretching the velum forward it will help the tube, and going into the fossa of Rosenmuller and stretching that region. It is simply a matter of massage, but some cases have been improved by this treatment.

DR. DELAVAN said that he had taken it for granted that no one supposed tinnitus aurium to be anything other than a symptom. Certainly no one in the discussion of the subject at Belfast thought otherwise. Dr. Barr had called especial attention to the many conditions of which it is a symptom. Of course, it may be associated with almost anything that could happen to the ear, and, of course, some cases differing from it are easily relieved. There are many other cases, however, which are difficult to improve, and some which up to the present time have absolutely baffled every attempt to relieve them. He had met with attempts at suicide in his own experience, and had no doubt that others present had known of similar cases. Certainly a symptom so terrible as to cause a patient to desire self-destruction ought to challenge most seriously the attention of the profession. Great attention had been given to operations of greater or less importance in otology, but the subject of tinnitus seemed to have received less attention than was its

due. The discussion at Belfast was important and it had been ably conducted. It was participated in by some of the best men of the time, and a strong desire had been expressed to rouse more general interest in the subject. It was for this reason that the speaker had asked the privilege of presenting the matter to-night. Not all our cases have been helped, but we may be able to help more of them if more attention is given to the subject than of late years it has received.

Removal of Petrous Pyramid for Suppurative Disease of the Labyrinth, With Presentation of Two Patients.

DR. JOHN D. RICHARDS presented two cases in each of which the major portion of the petrous pyramid had been removed. The first was operated on four years ago for simple mastoiditis; four months later, as healing had not occurred, a radical operation was performed. At the time there was no fistula in the outer labyrinth capsule, and the stapes was in position; two weeks later the patient suffered an attack of vertigo. Four weeks subsequent to the radical operation, upon removing fungous granulations from the solid angle of the semicircular canal system, a fistula was noticed at this point, and through this a probe could be passed into the vestibule. Immediate operation upon the labyrinth revealed the vestibule filled with pus, to which pulsation was imparted, the pus issuing in such quantity that it evidently came from the cerebellar fossa; the inner vestibular wall was found necrotic and perforated, and through this perforation an epidural abscess adjacent to the internal auditory meatus was emptying itself. In this case the pyramid was removed up to the internal meatus. A bridge of bone, including the facial ridge and an arch extending over to the internal auditory meatus, included the facial nerve.

The cochlea was filled with pus and was removed, with the exception of its inner wall. In attempting to remove the anterior portion of the inner vestibular wall, which was necrotic, the internal meatus was accidentally opened. The loss of cerebrospinal fluid was considerable and necessitated a discontinuance of the operation. At a later time, after the leakage of cerebrospinal fluid had ceased and the meatus had been sealed off, the apex of the pyramid was exenterated. The extreme pneumatic character of the bone, its large size and roomy proportion and the softening of the apex of the pyramid by disease enabled this to be done with a curette.

The second case was that of a chronic suppuration operated upon by a colleague four months ago. A perisinus epidural abscess was evacuated and the sinus opened for thrombosis; the wound did not heal. A facial paralysis appeared several months after the operation, gradually becoming complete. Upon reoperation it was found that the entire external vestibular wall, together with the arch of the external semicircular canal, was dehiscent, the vestibular cavity filled with pus and granulations, the facial nerve stretched as a bared structure across the cavity and was embedded in the granulation mass. The promontory was intact; upon its removal the cochlea was found occupied with pus, and the entire interior of the cochlea, including the modiolus, was necrotic. The interior wall of the vestibule, while not perforated, was necrotic, and upon removing it, together with the cochlea, the entire length of the internal auditory meatus was exposed. The meatus was represented as a gutter filled with black fungous granulations, and the inflammatory process had so sealed it up that there was no loss of fluid. Upon removing the base of the pyramid from without inward, as the cerebellar dura was separated from the posterior aspect of the petrous shell, an epidural cerebellar abscess was evacuated—its site being internal to the posterior portion of the vestibular cavity, the granulation mass blocking the internal meatus had evidently formed a portion of the abscess bed. The petrous apex was in this instance necrotic and easily exenterated, as there was no facial arch to save and no internal meatus to avoid, by beginning at the posterior aspect of the apex and removing in succession planes of the bone from within outward. This patient had no portion of the pyramid remaining except a part of his carotid canal and that which lies below the level of the tympanic floor. The sagging of the temporosphenoidal dura in this instance obliterated the major portion of the cavity within a week, there being no facial arch to hold the dura in position.

The symptoms in the two cases and their healing presented no features which were unusual.

DR. DUEL said that there were many points in the paper which it would be interesting to discuss, were it not for the lateness of the hour. One point, however, which had struck him with considerable force was the question of the mistake made in the region of the petrous and the cerebellar fossa.

He had an accident of the kind himself, followed by the death of the patient, which he felt was due to injury and subsequent leakage of the fluid into the wound.

DR. JOHNSON said that a most interesting point was that made in relation to the internal meatus as a route to the cerebellar fossa for the draining of the fossa. He had had a case in an old gentleman who fell and struck his head on the railroad track, with fracture of the base of the skull and rupture of the internal meatus, the dura and the tympanum, in which the escape of the cerebrospinal fluid was marvelous in quantity. If the head was turned to one side, after the ear had been thoroughly cleansed, and then in the course of a minute or two it was turned to the other side, a dram or more of cerebrospinal fluid would escape. This condition persisted for a number of days. About the seventh or eighth day the fluid commenced to decrease in quantity. During the period of excessive fluid flow the patient was reasonably comfortable, but as soon as the fluid ceased to flow he became violently delirious, his temperature rose to 104.5. Despite this, however, the flow continued to decrease, and in the course of four or five days the delirium gradually abated, the temperature subsided, and the patient finally made a good recovery, without any cerebral infection whatever. Great care was taken not to infect the injured area. No instruments of any kind were passed into the auditory canal, except the cotton probe and speculum, which were carefully sterilized. The rent in the drum membrane and the line of fracture through the bony auditory canal could be distinctly seen. He had never seen a case in which the cerebrospinal fluid flow from the ear in this case was equaled. It seemed to illustrate the point which Dr. Richards had made in relation to excessive draining of the cerebral fossa through the wound in case of accident during operations for suppurative labyrinthine disease.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOTOLOGY.

Regular Meeting, December 10, 1909.

DR. ROBERT LEWIS, CHAIRMAN.

Paper: Case of Thrombosis of the Jugular Bulb, Etc.*

BY JOHN R. PAGE, M. D.,

**Paper: The Sero-Diagnosis of Syphilis in Its Relation to Diseases
Of the Ear.†**

BY EDMUND PRINCE FOWLER, M. D.,

DISCUSSION.

DR. DENCH said that the report was a most interesting and desirable one, and cited an instance in which the Noguchi test had been of great value. The patient had been an Arctic explorer, who gave an exceedingly indefinite previous history. The patient applied for treatment at the New York Eye and Ear Infirmary, about two and a half years ago. When he first came under observation there was a slight discharge from both ears, and the patient was profoundly deaf. Owing to the profound deafness, it was impossible to obtain a definite history, but, apparently, he had suffered from a purulent discharge from both ears for a considerable period of time. When the patient first came under observation there was a scanty discharge from both ears. The external auditory meatus, upon each side, was extremely narrow. Both canals were filled with a purulent discharge. No perforation of either drum membrane could be made out. The patient complained of considerable pain in both ears, and some slight tenderness about the ears. This could not be definitely located upon palpation, either in the external auditory meatus or in the mastoid process. The patient had been to the hospital, and under regular irriga-

*See page 353.

†See page 367.

tion both the aural discharge and all pain and tenderness in the ears disappeared. He remained profoundly deaf and was treated by catheter inflation, at fairly regular intervals, for about one year. The hearing seemed to improve. About a year and a half after the patient came under observation he was placed upon small doses of pilocarpin. Almost immediately he began to complain of severe dizziness and general headache. The pulse became gradually slower and slower. He was admitted to the hospital, and an examination of the blood showed a positive Noguchi reaction. An ophthalmoscopic examination at this time showed hemorrhagic retinitis upon each side, with some slight elevation of each optic papilla. The headache, the slow pulse, and the ocular changes, were sufficient almost to warrant a decompression operation. Bearing in mind the previous aural history, the caloric test was applied to both ears, and both labyrinths were found to react normally to this test. Owing to the positive Noguchi reaction, the patient was placed upon hypodermatic injections of salicylate of mercury, and was also given iodide of potassium in exceedingly large doses. Under this internal medication all of the cerebral symptoms immediately disappeared and no operative interference was necessary.

Dr. Dench reported the case simply because it showed the value of the application of the Noguchi test in all doubtful cases of intracranial symptoms following a history of possible aural suppuration. The possibility of previous middle ear suppuration could not be excluded—neither from the appearance of the drum membranes when the patient first came under observation, nor from the appearance of the drum membranes at a later period, when the patient first complained of his cerebral symptoms. At this later period both drum membranes appeared thickened and indicated a possible previous suppurative process. Had the Noguchi test not been applied an operation might easily have been performed for the relief of the cerebral symptoms. The successful outcome of the case shows the advisability of applying this test in every doubtful case.

Dr. FRIDENBERG inquired whether the apparent preponderance of female children had been analyzed, on the statistics of the incidence of males and females in the general population or in the clinical population, and also whether the positive reaction was an indication of the specific character of the ear

disease, or indicated merely that the patient was syphilitic. The tuberculin test, as all know, is open to the same source of error which has seriously interfered with its usefulness. In the presence of a positive v. Pirquet or Calmette reaction we cannot be sure that the florid iritis or other affection for which we are treating the patient, is tuberculous, as the positive reaction may be due to some old tuberculous gland in the mediastinum or similar old, concealed condition, and the eye or ear affection may be entirely nontubercular. The comparatively high percentage of positive reactions in nerve deafness was certainly most striking and confirmatory of what we assume as to the etiology of this affection, and the low percentage in suppurative processes also corresponds to clinical experience. The paper has brought out some valuable points, and the speaker had no doubt that the doubtful ones, too, would be cleared up by Dr. Fowler.

DR. BACON congratulated Dr. Fowler upon his valuable contribution to this important subject. He had been particularly interested in what had been said about chronic catarrhal cases, and has wondered whether they might not be syphilitic, and this point ought to be studied more thoroughly.

DR. SHEPPARD inquired whether or not these so-called catarrhal cases were of the otosclerotic type. We have been wondering in regard to the etiology of otosclerosis, and syphilis has been suggested as a probable etiologic factor, and it occurred to him that it might be positive in the otosclerotic rather than in the other so-called forms of catarrh.

DR. HARRIS inquired in regard to the treatment—whether when Dr. Fowler found positive reactions he at once proceeded to put the patient upon antisyphilitic treatment, and if so, whether he noted improvement immediately. He had reference particularly to adult cases, where previously satisfactory results had not been obtained. That would clear up the question which Dr. Fridenberg has asked—whether it was general syphilis or syphilis of the ear.

DR. FOWLER, in closing the discussion, said that in regard to the proportion of each sex reacting positively he had probably not been heard, but that he had stated it was in children, two males to five females; the total number of cases in children was, males 25, females 41. In figuring the percentages, allowance had been made for this difference in the sexes. Likewise

in adults, due allowance was made for the number of each sex examined.

In regard to syphilis in ear disease being the cause or having relationship to the disease of the ear, he had tried to be careful, by stating that the positive reactions of the syphilis was present with the ear disease. He did not know, but inferred from the large percentage of syphilitics in these cases (so much larger than Dr. Noguchi had found, in his series of cases in which syphilis could be excluded), that the syphilis must have had a baneful influence on the otitis. In 335 cases Noguchi found only twelve which gave a positive reaction; seven were lepers and five were as detailed. The scarlatina case was very interesting from the fact that all of the serodiagnosis tests had failed to give negative reactions in many cases of scarlatina. When this case reacted positively, every one said—there you go, the same as Wasserman; but this child had an abscess on the leg, and when operated upon by two well-known surgeons infected them both with syphilis from this abscess. That was very strong evidence, with a vengeance, that the test was reliable. In other words, Noguchi's tests did not follow the other tests in giving unreliable reactions in scarlatina.

From the large number of positive cases in persons who had no other disease but ear disease, it might be inferred that there was some connection between the syphilis and the ear disease, and Dr. Fowler believed that there was some connection between the syphilis and the ear disease, particularly as these reactions occurred in the class of cases in which syphilis might be expected to be more prevalent. It is true, most of these gave specific histories, but they all reacted positively, and in this class of cases those that gave no specific history also reacted positively. We cannot state that all the cases giving positive reactions surely have syphilis, but this is a fair inference in the large majority of instances.

The question of otosclerosis was kept in mind and was mentioned in the summary, but he had not definitely diagnosed any case as otosclerosis, as he found great difficulty in making such diagnoses. With very few exceptions they were tested by Dr. Fowler's improvement of the Gellé test, and they all apparently showed a movable stapes, and he, therefore, doubted if there were any true cases of otosclerosis in the series, but he thought otosclerosis in many instances would give a positive reaction to the test.

He stated in his paper that all the adults improved under antisyphilitic treatment. Of course, they had also their regular treatment, and they might have improved anyway. One woman before the treatment could not distinguish anything except light and darkness, and she could not hear without her ear trumpet. After about eight months of treatment, she can hear without her trumpet and she can read. There was no doubt about that case, of course. The children were all given the antisyphilitic treatment, but they also had regulation treatment for their ear disease. He thought that the iodides and mercury, when indicated, did, without doubt, help the patients.

Paper: Thrombosis of the Lateral Sinus. When Should We Operate and What Type of Operation Should Be Performed?*

By E. A. CROCKETT, M. D.,

BOSTON.

DISCUSSION.

DR. GRUENING said that he felt he voiced the sentiment of the Section in thanking Dr. Crockett for his very able paper and for bringing this subject up for attention. He did not believe, however, that the paper would be attacked as Dr. Crockett seemed to think, for the practice in New York was practically the same as that in Boston. There may be a difference in some minor points. In the diagnosis of the disease some things are important—the rise and fall of temperature. There is no other ear disease which has such oscillations in temperature, with apparent perfect well-being of the patient. The diagnosis of sinus thrombosis is not always easy. In a case of ear disease where such temperature is exhibited we have to consider also other conditions. He had seen a case recently with high temperature in ear disease. There were chills and a lowering, a sudden fall of the temperature. He had not known the patient long, and he consulted with the family physician, and he said, "Don't operate, the patient has malaria, and if you give him quinin he will improve." This was done, and in a few days the man with ear disease lost his chills. In another instance that came under his observation recently, the general physician was called in, the Widal test was made, and it was found that the patient had typhoid fever. These things must

*See page 356.

be noted, if possible. It is the common practice in New York to view the sinus before ligating the jugular. When the diagnosis of sigmoid sinus thrombosis has been made the jugular is ligated, but it is not common practice to ligate without inspection of the sigmoid sinus. It is true that every sigmoid sinus does not indicate disease, but most sinuses do, and therefore, acting upon the fact that most sinuses will show disease, it is better to expose the sinus before we conclude to ligate the vein. What to do with the jugular vein when it has been ligated is another question. He himself has been in the habit of ligating very low and excising the whole jugular as far as possible; and as there always remains a stump of the jugular that is infected and drains into the wound, it is not wise to close the wound in the neck. Strapping the wound after a few days causes the wound to heal almost as rapidly as if it had not been left open, and the cicatrix which results does not constitute a deformity. Upon the whole, he felt that most of the members would agree with Dr. Crockett that we should operate as early as possible and as radically as possible. It would be correct and logical to consider sinus thrombosis alone without combining it with meningitis and abscesses of the brain and other conditions. Sinus thrombosis is a disease sui generis, and should be considered as such. If we have a case of sinus thrombosis and the patient dies of meningitis, it is not the thrombosis which caused the fatal issue. We should leave out all these cases of meningitis, for we cannot cure meningitis, and we cloud the statistics by adding meningitis. We can cure abscess of the brain very often. Only recently he had seen such a combination, where an abscess of the brain on the left side was diagnosticated, on the ground of optic aphasia. The patient also had sinus thrombosis, and he recovered. It is an easy matter to remove the jugular completely. It does not require any great anatomic knowledge to do this. The radical operation should be done. The only point on which he would differ with Dr. Crockett was regarding the treatment of the jugular vein. In a few cases he has found the whole jugular thrombosed, from the bulb to the clavicle. He removed the whole jugular, and the cases recovered. We should not despair in such a case even. We should remove as much as we can, and very often the patient will get well. The sinus thrombosis has nothing to do with meningitis or abscess.

and if we consider the question of sinus thrombosis alone, the mortality from sinus thrombosis will be greatly reduced. We should probably have 90 per cent of cases in pure sinus thrombosis, and perhaps even more than that.

DR. BACON said that he was very glad to hear the statistics that Dr. Crockett had reported, for they certainly make a splendid record, and we cannot show anything better in New York. Dr. Gruening has spoken of other causes of variations in temperature, which might be mistaken for cases of sinus thrombosis, and he would like to call attention to a condition in the case of a female infant, which he saw two years ago. The child had an acute otitis media, and had a rapid rise and fall of temperature, and it was a question whether or not it was a case of sinus thrombosis. The urine was examined, and a number of specialists saw the case. Operation was deferred for some time, as they could not decide that it was a case of sinus thrombosis. It was well that they did, for in spite of the fact that many examinations were made of the urine, it was not until later that it was discovered to be a case of pyelitis. The patient recovered. These cases should be looked for, especially in female children.

He was glad to hear what Dr. Crockett has said about the importance of not wounding the sinus during operation on the mastoid, for he himself has had several cases where he has opened the sinus during operation, and it is important to be very careful in operative work upon the mastoid not to injure the sinus. He fully agreed with Dr. Crockett in regard to the shock which the patient suffers from when the int. jugular vein is excised, and the operation certainly has been done in a number of cases where it was not necessary. It adds much to the gravity of the operation.

In acute cases where the thrombus has not broken down, he has been in the habit of simply removing the clot from the sinus, and then waiting for twenty-four hours. In most of these cases excision of the vein is not necessary, and it is better to wait, in many cases, especially in children, for it adds much to the gravity of the case to do the complete operation by excising the vein at the same time.

DR. MCKERRON said that, excepting in one or two minor points, the method spoken of by Dr. Crockett did not differ from the one he had described in a paper read in Boston some

five years ago. At that time he was asked if he had left the ranks of the conservatives and joined the radicals. He had advised that when the diagnosis of sinus involvement was made the sinus should be exposed and opened; then, if any evidence of pus or broken-down clot was found, to stop the operation, go down, expose, ligate, and resect the jugular vein. If, on the other hand, there was no evidence of pus or disintegrated clot, remove the septic material in the sinus and do not ligate the vein. As to ligating the vein and leaving it in, it has not been his practice to do so, even at the present time, where involvement of the sinus and vein has been made. In some instances he has done a primary ligation where the case had been under observation only a short time and came in with all the symptoms of vein involvement, and also distinct tenderness in the neck, resecting it and going in and evacuating the sinus of the contents above.

Dr. Crockett had spoken of ligating the vein and leaving it. Does he ligate it above or below the facial? If below the facial, it would seem that the pathway for a free infection was still left. He agreed with Dr. Crockett that in some cases it is wise to do a removal of the vein at the time of exposing the jugular and ligating it. That depends entirely on the condition of the patient at the time of operation. If the patient is in a fair condition, and you ligate below the point of thrombosis, the vein should be resected, for if you leave the septic vein in situ it will give trouble sooner or later.

In ligating you cannot remove all the vein above. There is a little stump which empties septic material into the wound above. In all the cases in which he has done a ligation he has left an open space for drainage and inspection for five or six days following. That, however, is optional, and depends upon the method of the individual operator.

He would like to learn from Dr. Crockett if all the veins removed in these sixty cases were examined microscopically, or only a certain number of them. The number of successful cases reported was certainly very gratifying; probably the cause of the favorable results in the hospital with which he is connected are due to early operation. At the present time in New York he doubts whether they would be operated upon so early as in Boston. Dr. Crockett's paper emphasizes what he had said five years ago about the importance of early operation when once the diagnosis is made.

DR. WHITING said that he agreed with Dr. Gruening that the members of the Section were not likely to take any violent issue with Dr. Crockett. Most of them agree that early operation is important—the earlier the operation the better the patient's chances for recovery. Some of the symptoms which he regards as necessary evidence of sinus thrombosis, however, seem very radical. If these same rules were applied to children, some veins would be tied off where there was no excuse for it. He recalled a case, and was sure others could do the same, of a remarkable exacerbation of condition in a child, which, so far as the temperature was concerned, would lead one to infer that some large blood channel was infected. Some years ago he had showed a temperature chart in which the child had a variation of nine degrees in temperature, and excepting for that appeared to be perfectly well. The physician in charge wanted him to go into the mastoid and sinus, which, however, he would not do. After a certain length of time the temperature dropped and the child got perfectly well. If he had been as radical as Dr. Crockett seems to be, he would have gone for the jugular first, and then and there tried to satisfy himself as to which side should be opened in looking for the sinus.

He had hoped that in speaking of convincing symptoms of sinus thrombosis the question of bacteremia would be brought up, for the more he sees of bacteremic work in reference to mastoiditis the more convinced he becomes that there is a definite and positive value in the observations. Many cases of simple mastoiditis which he has operated in the past year have been detected by blood cultures. The cases have been examined, and in no other cases of simple uncomplicated mastoiditis have bacteria been found present. A similar result has been announced this month in the *Med. Woch.* by Leggett, in which he mentions twenty cases of sinus thrombosis, in all of which streptococcus were found. In a vast number in which blood cultures were made, all of which were negative, and in which they found staphylococcus, it was simply the result of contamination from the skin from not having the surface properly cleaned.

In going into the sinus, the majority of the symptoms which Dr. Crockett had mentioned were well recognized, and in those cases where we have those symptoms no one would hesitate

to go in and operate for sinus thrombosis; but some lack just the degree of necessary convincing symptoms, and may not have the extreme exacerbations we look for; they may have ill-defined chilly sensations, the nurse may have overlooked the fact that there have been chilly sensations, and while one may strongly incline to the belief of that condition the symptoms may not be sufficiently definite. It is in just this class of cases where he feels that a blood culture made by a properly qualified bacteriologist would be of great assistance in deciding whether or not to operate, even though other symptoms which are usually considered essential may be missing.

In regard to the jugular, after it has been determined that there is a sinus thrombosis, he usually gets very good results. He believes in putting the ligature as low down as you can get it, and then extirpating the vein as far as you can go. In one or two cases where he left the sheath of the vein in, it became infected, and had to be opened. He therefore removes as much of the vein as possible, without unduly prolonging the operation. He believes in removing the vein as far as possible toward the clavicle and upward to the point of its emergence from the base of the skull.

As to the wisdom of doing a uniform removal of the jugular before opening the sinus, he is not yet convinced that this is a wise procedure. Last spring he had a case, in which he was assisted by Dr. McKernon, where there was a clot in the bulb—not in the dome, but in the beginning of the bulb—a parietal clot, in which there was no difficulty in expelling the clot—it came out like the pit from a ripe cherry—so both agreed that it would be a conservative procedure not to ligate the jugular. The sinus was accordingly packed off, and there was an uneventful recovery. He has had many other similar cases. His present attitude is much the same as it was a year ago, when he read a paper on the subject before the Section. He had said then that it was in the interest of conservative surgery to give the patient a chance to get well without opening the jugular. He does not feel so convinced of that now as then, but he cannot say, given a definite recognizable clot in the sinus, that you should ligate the jugular before opening the sinus and making an attempt at its removal.

DR. SHEPPARD said that Dr. Crockett had referred to the frequency of the occurrence of sinus thrombosis in acute as

compared with chronic middle-ear suppurations in a manner which concurs with his own experience. In regard to the advisability of early operation, the earlier the better after a distinct diagnosis is made.

As to the jugular, he put himself on record ten or more years ago as being in favor of tying off and resecting the jugular in all instances. Since then, after listening to other men's experiences and looking over the results of cases, he feels that he must confess to a modification of his former view, and at present, excepting only in extreme cases, it is his habit to investigate the sinus first. As a general rule, he opens the sinus and notes whether there is a return flow from above and below, and feels that by so doing he gives the patient a chance to get well without destroying the jugular. Although he feels more comfortable and more happy when the jugular has been tied than when it has not, still the statistics show that an equal number have gotten well, whether the jugular was tied or untied. As regards the question of resection, as contrasted with simple tying off of the jugular, it has been his custom to resect from as low down to as high up as possible.

As regards cases with high temperatures, two weeks ago last Monday two cases came under his observation—one a child of seven or eight years, in which the family physician called him up and wanted him to see the case. After hearing about the temperature and a brief history of the case, Dr. Sheppard made a diagnosis over the 'phone of lateral sinus phlebitis. The child was sent into the hospital, and was operated upon within an hour or two, and a very evident unhealthy sinus was found, in which the clot popped out from below, as Dr. Whiting had described. The doctor contented himself with this and a radical mastoid operation, and the child is progressing rapidly toward health.

On the same day a six or seven month old infant was sent into the hospital as a case of sinus phlebitis, the diagnosis having been made by the attending physician. The history was that the temperature had been running from normal to 105° , with a regular daily curve, reaching normal at certain times in the morning and 105° or thereabouts later in the day. He examined the child's ear, and saw simply a slightly congested pair of ear drums, not bulged, and he felt very doubtful about there being any effusion into either of the tympanic

cavities. In order to satisfy himself and clear himself of any possible criticism, he incised the drums freely, and put the child on the usual after-treatment. The incision had no effect on the temperature, which continued exactly as it had been for several days, an absolutely regular curve. The blood was examined, and no plasmodium was found; the Widal test was negative. The ear healed up in three or four days, but there being some remaining congestion one of them was again cut. The child is still running a temperature.

All that quinin would do was to delay the top of the curve by about four hours. He was under considerable criticism for not going in and opening the sinus, but could not bring himself to believe that it was a case of sinus disease. The child does not appear to be septic, and has no chills or blueness of the extremities preceding the rise. The only symptom is the temperature. He said that he would appreciate any suggestions that might help him out in the case. The case is still under observation, but he feels unwarranted in going in, for there is no indication as to which bulb should be attacked, and he could not feel that the sinus was involved. In reply to a query as to whether a blood culture had been made, he replied in the negative.

DR. ALDERTON said that Dr. Crockett's paper had given considerable food for thought, and he would certainly read it over carefully when it was published. A point that seemed to him to be of value in these cases is not only the leucocyte count, but having a differential count made every day—to watch the polymorphonuclear percentage. In his experience that was of more value than the leucocyte count alone.

He would like to emphasize one point made by Dr. Sheppard—that is: the danger of disseminating infection by the force used in chiselling. It has been his custom, recently, in cases of sinus thrombosis, or cases giving evidence of some meningeal irritation, not to use the hammer and chisel, but to uncover the mastoid thoroughly below the tip, cutting away the sternocleidomastoid muscle, then biting off the tip with rongeurs, and working up with the rongeur and curette. This is quite easily done in the majority of cases.

DR. DENCH agreed with Dr. Alderton regarding the importance of taking a series of blood counts, in these cases, if any definite information was to be obtained. If a blood count is to

be valuable a series of observations must be recorded. Occasionally he had seen a high polymorphonuclear count in cases of sinus thrombosis. In other instances, however, when sinus thrombosis, with extension into the internal jugular vein, had been demonstrable at the time of operation, there had been no increase in the number of polymorphonuclear leucocytes. The differential blood count was, therefore, confirmatory, if positive, and of absolutely no value, if negative. A great deal had been said by different speakers regarding the value of the white blood count. An increase in the number of white blood cells simply indicates that the patient is developing a good resistance to the septic infection. It is of no value at all in establishing a diagnosis of sinus thrombosis. The accidental opening of the lateral sinus had not, in the speaker's experience, proved a serious matter. This accident had happened to him a number of times, and in no instance had it been followed by sinus thrombosis. In his earlier practice he had been very much disturbed by the accidental opening of the lateral sinus, but at the present time—provided the operation had been conducted under proper aseptic precautions, he did not feel that the accidental opening of the lateral sinus was a matter of any great gravity. Naturally, he avoided the accidental opening of the lateral sinus whenever possible, but, in his own experience, it did not interfere with the favorable progress of the case in a single instance. It had been the speaker's rule to clear out the mastoid thoroughly and to remove all purulent foci from the bone before invading the region of the lateral sinus. If this plan of procedure is followed, and the sinus is accidentally opened late in the operation, there is very little danger of infection.

Regarding the occurrence of metastases after the removal of a septic clot from the sinus by means of the curette, this had never occurred in the author's experience. He had many times curetted the lateral sinus for the removal of septic clots, and always with exceedingly favorable results. The statistics published in the author's last edition of "Diseases of the Ear" demonstrated conclusively that, in early cases, a septic thrombus could be removed from the sinus with perfect safety without previous ligation of the internal jugular vein. In cases of early thrombosis, his procedure is the same as that of the other gentlemen who have already spoken—that is, Dr. Dench

always opens the sinus and cures out any clot present, care being taken that before the curette is introduced downward toward the jugular bulb pressure be applied to the internal jugular vein, in order to prevent the possible aspiration of air into the right side of the heart. In cases where the sinus thrombosis is well advanced, as, for instance, where there is actual free pus in the sinus, and where the return circulation from below is not readily established, it is then his practice to ligate and remove the internal jugular vein at the primary operation. In these advanced cases he deems it better surgery to place a ligature about the internal jugular vein, low down in the neck, prior to the removal of the clot from the lower end of the sinus.

While Dr. Crockett's statistics as to the comparative value of simply ligating the vein, in preference to excising it, seemed very convincing, the speaker felt that he would not be justified in adopting this procedure. He believed it to be important that the internal jugular vein should be completely excised, in every instance, where a clot was demonstrable in the jugular, or where the sinus thrombosis was well advanced. In other words, if the jugular was interfered with at all, it should be excised from a point in the neck well below the limit of the clot to a point as near the base of the skull as possible. All tributary branches should be carefully tied off and divided between two ligatures. Dr. Crockett's statement that, in certain cases, it was advisable to tie the vein through its clotted portion, seemed to the author absolutely unwarrantable. In every case where the vein had been tied so as to allow a certain portion of the clot to remain below the point of ligation, these cases had terminated fatally. He cited the statistics of Grunert in justification of these ligations and remarked that Grunert had cited, at least, two cases where a ligature was placed about the innominate vein in instances where the jugular was found to be occupied by a clot throughout its entire extent. In the cases where the speaker had met with a thrombus occupying the jugular throughout its entire length, the condition of the patients had not warranted the application of a ligature to the innominate, as such an extensive surgical procedure would undoubtedly have proved immediately fatal. He believed, however, this to be the procedure of election in these cases. The objection to the simple ligation of the internal

jugular, without excision of the vein, and without ligating the vein above the facial, depended upon the fact that, owing to the free collateral circulation which exists between the internal jugular vein of both sides, through the facial veins, a thrombus in one jugular vein would probably infect the general circulation through these collateral vessels. It seemed to the speaker imperative that the entire infected vein should be removed, and that the facial vein of the affected side should be tied off, if such general involvement was to be avoided. Regarding the treatment of the wound, in cases where the jugular was excised, the author stated that it was his practice to close the superficial wound completely, excepting at the lower angle and at the upper angle. A rubber-tissue drain was usually placed in the lower angle of the wound, this drain extending beneath the deep fascia, in order to completely drain the dead places. At the opening left at the upper angle of the wound an iodoform gauze packing was inserted, so as to prevent infection of the deeper structures from the upper end of the vein. In fully 75 per cent of his cases primary union of the neck wound was obtained.

DR. DUEL said that we all gain from personal experience ideas that are bound to influence us. His own views from such experience led him at present to feel that in a case of undoubted sinus thrombosis the important indication was to cut off the infected area from the general circulation with the least possible shock to the patient. That this might be accomplished by the ligation of the jugular vein and the blocking off of the lateral sinus above the clot, Dr. Crockett's statistics had clearly shown. These cases demonstrated that the cause of death is the passage of infection into the general circulation, and that when converted to a local condition the infection could be easily coped with. Statistics have shown the world over that cases operated upon during the first week after the infection have been cured in twice as many instances as when operated during the second week. These statistics include operative procedures which simply open the sinus and evacuate the clot, as well as those in which the vein is also ligated. The method of operation is not of as much importance as the early diagnosis and cutting off of the infected area from the general circulation. However, in a case in which the sinus gave no physical evidence whatever of a clot, when from the symptoms he was,

nevertheless, led to operate, he would be inclined to tie off the vein before interfering with the sinus; experience has shown that such cases may have a clot in the jugular bulb which may or may not be evacuated, and yet the patient recovers if the blood current has been stopped in both directions. He believed that altogether too many cases had been lost in an effort on the part of the operator to "demonstrate a clot," or establish a flow of blood from both ends.

If Dr. Sheppard desired any support in not operating on the infant with a widely oscillating temperature, but no other signs, he would find scores of charts in the Babies' Hospital in which wide vacillations of that type occur in infants under two years of age—many with and many without middle-ear suppurations. Last year he had presented two exactly similar charts with varying temperatures, from 99° to 105°, for many days, one with a double suppuration of the ears, and the other without any evidence of ear trouble. In neither case was there any definite evidence of a septic blood clot to account for the condition. He could show scores of charts in which a diagnosis of sinus thrombosis, from vacillating temperatures, had been seriously considered, owing to the concomitant otitis. Most of these cases recovered. In some of the earlier ones his personal feeling had been that an operation was advisable. In one of them, in particular, in which death occurred, he had opportunity to examine the case, and found the sinus perfectly clear. He had, therefore, modified his judgment regarding the significance of wide vacillations in temperature in infants.

DR. KENEFICK said that there were one or two points on which he would like to say a word. He was glad that the treatment of the sinus here in New York after it had been exposed had been made clear to-night by those of large experience in these cases, and the question definitely answered—whether or not we should curette the jugular bulb before the internal jugular vein has been tied off. In Dr. Dench's clinic years ago there were many recoveries, and that was the result looked for in cases in which the clot was successfully removed from the jugular bulb. From the experience of those who had spoken to-night, we can now formulate a fairly definite mode of procedure according to the condition of the sinus wall and the nature of the clot.

He had been much interested in what had been said about

children, for it corresponded with his own experience. If he had any criticism of Dr. Crockett's paper to offer, it might be that he had not laid sufficient emphasis upon the difficulty of diagnosing this condition in young children and infants. It would seem that a different mode of procedure should be followed from that pursued with adults, at least in children under three years of age. Last fall, at the same meeting before which Dr. Duel presented his temperature charts, he himself had told of two cases at the Foundling Hospital with suppurating ears, each under three years of age, and each with typical sinus thrombosis temperatures at the same time. His attention was directed to the first child too late, for it was in such a condition that he did not feel that operation would avail, although it seemed quite clear that the child was dying from venous poisoning. There was no sign of mastoiditis in either case. In the second case he was anxious to operate, but the mother refused to let him do so. A postmortem examination of the first case showed a primary thrombosis of the jugular bulb; the second case, which, to all intents and purposes, presented exactly the same picture, recovered without any operation whatever and without having a definite diagnosis made.

In the case referred to by Dr. Sheppard, if he were called upon for suggestions, he would advise a blood culture at the earliest possible moment; if it were positive, it would prove the nature of the case, but if negative it would not prove anything.

DR. FRIDENBERG said that the value of the blood culture was so great that he would beg to bring up the subject of this diagnostic aid again and add to what Dr. Whiting had said. The importance of blood cultures was certainly not sufficiently recognized, as indicated by the fact that it is not a routine measure, as it should be, with the exception of possibly a single New York institution, while the discussion to-night indicated very clearly that otologists were still attaching a great deal of importance to the differential leucocyte count. If, as has been said, an early operation is important in sinus thrombosis, then any method which will enable us to make an early diagnosis of, or to exclude, thrombosis must be of the greatest value. Dr. Crockett considers the high, remittent temperature, with chills, characteristic, as do all of us, and advises operation after a three days' continuance of such a typical condition. But what if we can save two days? What, if after the

first unexplained rise of temperature or the first chill, we make a blood culture and have positive findings? We can make the same test, instead of waiting, where the temperature curve is atypical, or in the cases mentioned by Dr. Duel and others, where in children it was misleading. All these cases would have light thrown on them by study of the blood cultures. Again, after removing a clot from the sinus, as in the cases mentioned by Dr. Whiting, are we to wait for renewed rise of temperature and chill before ligating or excising the jugular, when blood culture will give us definite information? Positive cultures persisting will indicate a continued entrance of bacteria into the blood current from a source of sepsis in the sinus, while negative cultures will as definitely prove that this source of infection has been eliminated. Anyone who has had the least experience with bacteriology, or even the assistance of bacteriologists in a case or two, ought to know that a single negative finding means nothing. In their recent authoritative publication, Libman and Celler review four or five reasons which would occur to us on consideration. Thus, the removal of an insufficient amount of blood, few bacteria in the blood, their development after the culture was taken or their disappearance before, and so on. Bearing these purely technical exceptions in mind, they lay the utmost stress on the diagnostic and prognostic importance, not only of positive, but almost equally of negative, and this means repeatedly negative, blood cultures. The fact that a sinus thrombosis has been seen in a certain case and that a single blood culture showed nothing; this fact, I say, also shows nothing. As indicated by the reader of the paper, the clinical signs may be misleading; pyelitis, central pneumonia, typhoid, malaria, may be mistaken for sinus thrombosis, and there is not always the definite history of a recent mastoiditis or even of previous ear disease or ear operation. At Mt. Sinai Hospital a number of cases had been diagnosed with the aid of the blood culture, which had come into the general ward. In spite of the inconclusive nature of the clinical symptoms, which we are told here invariably decide the diagnosis, these cases were recognized as cases of sinus thrombosis and transferred for operation to the otologic division, where the diagnosis was confirmed on the operating table.

DR. GRUENING recalled the fact that he had read a paper on

the subject, showing the importance of the positive results in blood culture. The negative result does not show anything. There may be a clot. Quite recently he saw a case of sinus thrombosis, but the blood culture was negative. The symptoms of sinus thrombosis were so distinct that he decided to operate, in spite of the negative results of the blood culture, and a sinus was found filled with pus from the lower knee to almost the torcular. The positive blood culture is of value; the negative blood culture shows nothing; there we must rely upon the clinical data, which are of more importance than the blood culture.

DR. CROCKETT said that to his mind the weak point in his paper lay in the differential diagnosis between sinus thrombosis and malaria, for those are the easiest to confuse.

There was one disease which he had not mentioned in the paper which has been the cause of much distress to him—the coming on of pneumonia in children who present a high polynuclear percentage, and have the symptom of septicemia. He could see no way of doing this unless the bacteremia would help. Pyelitis also gives a high polymorphonuclear count and a high leucocytosis, and is a very difficult condition to diagnose.

In reply to the query as to whether these examinations were all from the ligated jugular vein, they were taken from only 35, and he only quoted that number. It is now a routine method.

In regard to ligating only, he felt that the objections which had been brought up were purely theoretic. He has never seen any trouble result from leaving the vein in the neck once it is ligated. He has done forty other cases besides those here reported, making 100 in all—in all of which he tied below the facial, and he has never yet seen a thrombosis, except from one to the other, giving a general metastasis. Since he has followed this method he has never seen any metastasis at all. He was led to be emphatic on this point by two very distressing cases—one of these was a fine woman whom he knew, who had a thrombosis of the lateral sinus. Before tying the jugular he opened the lateral sinus and cleared it out. The next day there was a double thrombosis of both axillary veins, and the patient died of moist gangrene. That process came from curetting the sinus and not tying the jugu-

lar first. In the next case the patient was a child, and while on the operating table exploring the lateral sinus the patient died.

The autopsy showed embolus from the lateral vein, and instant suffocation of the child. These instances convinced him of the necessity of tying the jugular first. It is very easy to do it, and then tie above all you want. If Dr. Gruning's suggestion of excluding the cerebral cases—with which he agreed—his records would show prolonged life in 52 cases, with a very low mortality. If they are included, we have a recovery of 90 per cent. He believed that the mortality was very much lower than is obtained by interference without ligating the jugular vein. The time of recovery in these cases was about four weeks.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOTOLOGY.

Regular Meeting, January 14th, 1910.

Paper: The Report of a Case of Cerebral Abscess Occurring in Connection With a Chronic Middle Ear Suppuration.*

BY HUGH B. BLACKWELL, M. D.,

NEW YORK.

DISCUSSION.

DR. KENEFICK said that he had been much interested, because there is great difficulty in diagnosing the true conditions present in such a case. In the first place, the case gives a history of a year's discharge. It is a question whether one would be justified in doing the radical operation on a case with a discharge for a year previously unless there was evidence that it was absolutely necessary. It would seem that the headache in this case would be the keynote upon which to proceed. Headache is almost pathognomonic of brain involvement—either an epidural or a subdural abscess. Dr. Blackwell had raised the question of stirring up a latent abscess. The speaker said that he himself had succeeded in stirring up such an abscess by a very slight operation in the canal, and bringing the patient's life to a sudden close.

Another point was the question of multiple abscesses which might be raised in this case. Dr. Whiting claims for his encephaloscope that it gives such a view that one is not likely to overlook any secondary abscess in the neighborhood. It is barely possible that additional abscess cavities might have been present. We are always led to believe that we must associate a low pulse with cerebral involvement, but Krause, in a recent work, maintains that there can be a great deal of intracranial pressure without specially lowering the pulse.

Dr. Blackwell said that when the dura was exposed in the tympanic cavity granulations were present, which appeared

*See page 376.

healthy. That is another point—that the dura can appear perfectly healthy and have healthy tissue between the cavity and the source of the abscess. One might raise the question as to the best method of opening into the abscess. That point has been thoroughly threshed out in this Section, and the weight of opinion has been in favor of opening into the brain as near the point of origin as possible. Dr. Blackwell had done well to get through and through drainage at the lowest point. The cavity should be thoroughly emptied by this method.

DR. BRYANT said that there was little left for discussion after Dr. Blackwell's treatment of the subject, although the time of the origin of the abscess might be considered. That question could not be finally decided, however, as there had been no autopsy. When Dr. Blackwell first saw the dura it was normal; the second time, it was abnormal. That fact spoke for a recent occurrence of the abscess, and the condition of its walls were in favor of an acute process. On the other hand, the early headaches would indicate a latent process. The argument is, perhaps, as good on one side of the question as on the other. There was no definite proof.

The question of the treatment was purely surgical. And such cases should be treated along the general surgical lines which produce the best drainage possible. This can be done only through a wide brain incision. The trouble in most cases of brain abscess is that the surgeon is afraid of cutting into the brain, and most of the incisions are not large enough. The site of the infection should be thoroughly exposed, and the incision should be triangular, with a wide base. Brain hernia is not dependent as much upon the incision as upon the increased interchondral pressure resulting from the infection.

DR. BLACKWELL, replying to an inquiry in regard to eye symptoms, said that the eyes had been examined, and there was no evidence of papillitis.

Paper: Latent Mastoiditis With Epidural Abscess.*

BY ALFRED BRAUN, M. D.

DISCUSSION.

DR. KENEFICK said that he was sure the members were grateful to Dr. Braun for bringing this subject to their atten-

*See page 381.

tion, for it was most important that these cases should be recognized as they pass through the clinic. It is marvellous how much destruction of the mastoid bone, granulation tissue, and formation of pus can go on with apparent freedom from pain and without giving the least temperature. He had thought much about the reasons for the absence of pain and temperature in such cases, and Dr. Braun had given a very good explanation. His own experience has been that such patients had rather a thick than a thin cortex, and that they have had a large mastoid process with innumerable cells, through which the pus could slowly disseminate, and allow the brain to adjust itself to the conditions. The edema of the posterior superior wall is a regular symptom, well recognized in all cases of mastoiditis. He has frequently operated on that symptom alone, when the patient could blow through the drum and the discharge had apparently ceased. Another characteristic sign was noted in the character of the perforation, which often becomes titlike and protrudes from the drum.

Dr. Braun had not gone into the subject of the bacteriology. Dr. Dixon, at the New York Eye and Ear Infirmary, has reported in a number of these cases that the microorganism most frequently found responsible is the streptococcus capsulatus. This organism produces exactly this condition in all cases. These are the cases that are sometimes brought into the hospitals in a comatose condition. They go home perfectly well, apparently, but we should be on the lookout for them, especially when they have made one recovery and return complaining again. They frequently say they have no great pain, but they cannot sleep.

Dr. BRYANT said that Dr. Braun's grouping of those cases is a very useful and important one. Such cases are not usually overlooked in the aural clinics, but they are frequently overlooked in the general clinics. His remarks as to the importance of recognizing cases of this kind is quite correct. When the symptoms occur while the patient is convalescing from acute middle ear conditions, they are always a dangerous sign. Dr. Braun's leads up to another, where there has been no perforation from the middle ear abscess. Dr. Bryant has seen cases like this, where the middle ear appeared normal, but where there was a history of recent middle ear inflammation.

DR. RAE said that these cases of latent mastoiditis were of great interest and occurred in the experience of all. Each of such cases has had a more or less acute stage, and the moral of the story is, that the acute stage is the time to operate, before toleration is established.

For various reasons, operations will not always be permitted, so that doubtless these cases will continue to be seen from time to time. Their occurrence would almost justify the view that once the diagnosis of mastoiditis has been established immediate operation offers the best safeguard to the future welfare of the patient.

Paper: Observations on Pathologic Conditions of the Nose and Throat, With Special Reference to the Tubal Regions Associated With Chronic Middle Ear Catarrh. (A Study of Fifty Cases.)*

BY HAROLD HAYS, M. D.,

NEW YORK.

DISCUSSION.

DR. KENEFICK: The pathologic conditions described to-night in cases viewed during life have been minutely described in German literature before 1850, and the bearing they have in producing ear disease was dwelt upon at that time, though, of course, the examinations made were postmortem. This is astonishing, especially when we consider that examinations of the tympanic membrane in the living were made by the greatest otologists by daylight reflected from a hand mirror. It seems now that we can examine the nasopharynx in the living being by Dr. Hays' apparatus. It is impossible to discuss this subject fully, as it is too extensive; the whole evening could be devoted to the conditions in the nasopharynx alone.

Dr. Kenefick said that he was especially interested in what had been said about the relations between deflected septa and the ear. Many years ago he himself had been interested in trying to make out whether the ear on the side of the stenosis was constantly affected, and he finally concluded the air conditions in the nasopharynx were so disturbed that the deflection could affect either one or both ears. He wouldn't touch

*See page 295.

upon the pathologic conditions of the nose, for they are well known, but the pathologic conditions in the nasopharynx have been described to-night in such a way that it is a pity the inclement weather had prevented a larger audience from being present to hear and discuss the paper. We have heard to-night a description of the basic cause of perhaps 95 per cent of all ear diseases; that is saying a good deal, but after many years of observation of these conditions, especially in children, he has come to the conclusion that the conditions which have been described in the fossa, overhanging the tube, protruding against it, and interfering with its drainage and ventilation, are at the bottom of those diseases of obscure origin observed in the internal and middle ear. They are probably due to the vascular conditions produced by these growths and obstructions in the fossa of Rosenmüller and about the mouth of the tube. Finally, it is perfectly evident that when the eustachian tube is closed or its action is interfered with, a middle ear disease of some kind is sure to follow.

With regard to the conditions which keep up vascular engorgement, the general poisons, tobacco and alcohol, must be kept in mind. The subject is so extensive that it is impossible to decide which ramification is most interesting to consider, but he wished to insist upon the fact that unless the adenoid tissue is removed from the fossæ of Rosenmüller, any and every operation is a failure, so far as the ear is concerned. This is a most important point in these days, when physicians are selected for their duties in the public schools and in some other quarters. We all know that the removal of adenoids is considered by some a very slight operation and treated lightly, but it is the duty of the physician to fully understand this procedure and see that a child who is subjected to this operation should have the complete benefits which always follow its proper performance.

Dr. Cocks said that Dr. Hays' remarks in regard to the fossa of Rosenmüller interested him especially. For some time he himself had been paying particular attention to this subject whenever he examined a nasopharynx. In addition to adenoid tissue in Rosenmüller's fossa, he has frequently seen mucofibrous bands running across the fossa. In one such case, observed at the Manhattan Eye, Ear and Throat Hospital, there was a large fibrous band, nearly as thick as a lead pencil,

which crossed from the tubal orifice to the wall of the nasopharynx.

Dr. Cocks stated that he has not found the uniform improvement in hearing claimed by many writers who have reported catarrhal deafness cured by operation upon Rosenmüller's fossae, although he has faithfully followed up the after-treatment to prevent recurrence of adhesions. He believes, however, that this method should be tried whenever indicated.

DR. BRYANT said that Dr. Hays' excellent pharyngoscope would lead to a more intelligent study of the condition in the nasopharynx. He would like to say a word on the subject of pharyngotympanic ventilation. Dr. Hays used a catheter to discover whether the tube were open or not. Now, it may be physiologically closed, and yet be opened; with a catheter properly introduced any tube not cicatrized can be opened. One must employ a very delicate test for the physiologic function of a tube. Dr. Bryant has always used either Valsalva's, or Politzer's inflation, and in order to observe the drum membrane during the inflation, has placed the tube in his own, as well as in the patient's ear. In most cases the motions of the drum membrane can be seen during the inflation, although in a few the drum membrane is so rigid as not to yield at all to the pressure.

He has tried Dr. Hays' instrument for some time. It is easily used, and one obtains a view of the nasopharynx that can be had in no other way. The value, however, of the examination would be increased if it were supplemented by the older salpingoscope, with which one can see the motions of the tubal cartilages. Dr. Hays' instrument does not permit a very good view of the cartilages when the patient is swallowing, whereas if you look through the salpingoscope the cartilages can be observed during the act of swallowing.

DR. KENEFICK: With regard to breaking down the adhesions in the fossa of Rosenmüller he could say nothing, as he had not tried it in a sufficient number of cases to speak authoritatively, but in four or five cases which he had operated upon under nitrous oxide gas, he had not met the success which he had expected. The adhesions which were broken very soon became attached again, and the benefit which was apparent at first did not last. In regard to the thimble of which

Dr. Cocks had spoken, he did not himself believe in using anything but the finger, and he doubted very much whether it was possible to get any mechanical appliance which would properly clean out the fossa of Rosenmüller without doing damage. The finger is the proper thing to use.

DR. HAYS, in conclusion, said: It was not my intention in this paper to do more than impress upon you the great variety of pathologic conditions of the nose and throat, especially the nasopharynx, which directly or indirectly cause chronic middle ear catarrh. It has been my experience that the treatment of the ears is of secondary importance; if the pathologic condition of the nose or throat is treated properly, the improvement in hearing will often be quite marked. Such an example is shown by the following case, which came to me four months ago. The patient, a man, nearly seventy years of age, was almost totally deaf, not being able to hear a watch at the left ear, and about one inch from the right ear. He was very much discouraged, as he was given practically no hope by many of the most noted specialists. I told him I would give him a month's trial. During that time I treated the nasopharynx directly, making applications of medicaments through the nose into the nasopharynx, which I had in view by placing the pharyngoscope in the mouth. At the end of four weeks a watch could be heard six inches from the right ear and over one inch from the left ear. Very little attention was paid directly to the tympanic cavities.

In regard to adhesions in the fossa of Rosenmüller, I do not wish to leave the impression that simply the removal of them, without any other treatment to the tubes or nasopharynx, will cause a cure of a middle ear catarrh. Of course, it is impossible to say whether they are responsible for the catarrh; I can only state that in the cases that I have examined I have never found a chronic middle ear catarrh without finding some adhesions in the fossa of Rosenmüller. The holding of the caryle membrane in place is often a matter of chance. In some cases it will remain in the fossa one or two days. Where it does so, there is certainly no question that it aids considerably in avoiding the reformation of new adhesions.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOTOLOGY.

Regular Meeting, February 10, 1910.

Mastoid Curettes.

DR. HUGH B. BLACKWELL presented some mastoid curettes.

New Rongeur Forceps.

DR. BRYANT showed two forceps—one a heavy rongeur with a long lever, which he has been using for four years in removing the mastoid tip, cortex and calvarium. This rongeur is especially advantageous, because it saves a great deal of time.

Dr. Bryant also exhibited a smaller rongeur, which he has recently designed, and which has proved effective in removing the smaller, deeper parts of the bone. This instrument is especially adapted to removing the bridge of the annulus tympanicus in the radical operation.

Paper: The Classification of Middle Ear Diseases on a Pathologic Basis.*

By S. J. KOPETSKY, M. D.

DISCUSSION.

DR. PHILLIPS said that he had given careful consideration to the arrangement which Dr. Kopetsky had made with the object in view of improving the classification of middle ear diseases. One point, which is particularly worthy of emphasis, is that it clears up in a way that all can understand and presents a definite classification of those diseases which we call catarrh, for the reason that we have no better term, and those which we call suppurative. The so-called catarrhal affections are nonbacterial, not due to bacterial invasion, and are the acute conditions which give rise to an inflamed drum, with or without an infusion into the tympanic cavity, but are

*See page 319.

never purulent in character. One distinctive feature in this class of cases is that the drum is always retracted, in contradistinction to the purulent invasions where the drum is bulging. This point, at least, is worthy of comment. Dr. Phillips said that he was impressed with its importance from having gone over the literature of the text books, and in almost every one, in the final discussion of the cases which we are prone to call catarrhal invasion, the textbook will say that the disease may eventuate in suppuration, whereas, in fact, it never does, except when a new invasion is superimposed upon the original condition.

As to the question of the seriousness of the marginal perforation, he was not sure that it always represented a serious type of disease. When located in the attic region or the posterior superior of the drumhead, there was greater probability of extensive necrosis than otherwise obtained; but it was not common to find these perforations perfectly dry and healed, wherein no serious complications had ever occurred.

DR. GRUENING said that he had not had time to examine the classifications very carefully, but when a new nomenclature is presented, based upon pathology, the name of "otosclerosis" ought to be considered. It is described in this paper as spongification of the labyrinthine capsule and as an osteitis rarificans. If this is so, why should the name otosclerosis be retained?

DR. FOWLER regretted that he had been unable to go over the proposed classification very carefully, but he would like to ask one question. The writer of the paper had brought out very strongly that catarrh of the middle ear was not of bacterial origin. Why may not a catarrhal process in the middle ear be due to bacterial origin, especially if secondary to acute rhinitis.

We have much to learn about all catarrhal processes, and it may be that many such are due to ultramicroscopic bacteria, or to various conditions modifying the virulence or the activities of known bacteria.

Along the same lines of criticism that Dr. Gruening had expressed, he would take exception to the phrase "pathologically understood."

DR. KOPETZKY, replying to Dr. Gruening's remarks, agreed with Dr. Gruening that the term "otosclerosis" was incorrect

as a scientific term, applied to a lesion signifying a spongification of the labyrinthine capsule. He said that he was always happy to follow Dr. Gruening's teachings, and that he would gladly accept any suggestion for a different term to be thus used. At the same time he begged to remark that he had not attempted to invent any new terms, but had tried to classify the diseases and conditions under the names which were commonly understood. Regarding typographic errors in the printed schedule, he felt that he must apologize for the poor proof reading on the part of the lay printer.

In closing, Dr. Kopetzky remarked that a classification such as had been presented could not be discussed within so short a time, and that he wished it to be understood as a sort of preliminary report on the subject, and that he hoped that a further study of its details would commend it to the members.

Paper and Lantern Demonstration: "Symptomatology and Pathology of Diseases of the Labyrinth."

BY HEINRICH NEUMANN, M. D.,

VIENNA.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOTOLOGY.

Regular Meeting, March 11, 1910.

Paper: Report of Two Cases of Lateral Sinus Thrombosis Treated, Postoperatively, With Hiss' Extract of Leucocytes.*

By SAMUEL McCULLAGH, M. D.,

Paper: The Practical Value of Serum Therapy and Use of the Leucocyte Extract of Hiss in Infections of the Ear, Nose, and Throat, With Reports of Cases.†

By J. G. DWYER, M. D.,

DISCUSSION.

DR. SONDERN expressed his thanks to Dr. Dwyer for the very able and comprehensive paper presented. He had had the advantage of being allowed to look it over closely before coming to the meeting. It presented better than most others he had read the present-day position of vaccine therapy. Dr. Dwyer's experience, on the whole, corresponds exactly with that of other good men who have used this procedure carefully and conscientiously. It seems well that renewed interest has been awakened lately in vaccine therapy, for there is without doubt much value in it. The important point for the clinician is to learn in which conditions its use is valuable. In the preliminary program of the Congress of Physicians and Surgeons, to be held in Washington soon, the entire general session on Tuesday, May 3, is given up to this subject, and there will be papers presented by Hektoen, Gay and others, which will be discussed by Adami, Stengel and others. The Executive Committee has also recommended to each component association that the subject of vaccine therapy be assigned to the afternoon session, to be treated from its especial standpoint by speakers from its own members.

*See page 387.

†See page 394.

There were two points in Dr. Dwyer's paper which the speaker desired to emphasize, namely, his remarks on the limitations of the treatment, and particularly those on the contraindications. He believes there is no one who has not seen one or more cases in which the administration of vaccines has not resulted in definite, undoubted harm, due to this administration and not to anything else. Those that he has seen were all tuberculosis cases. The caution which Dr. Dwyer has sounded against the improper use, especially, of tuberculosis vaccine cannot be too strongly emphasized. He recalled four cases, one of which resulted fatally, and the other three were undoubtedly harmed by this treatment.

It is now six or seven years since Wright made his original claim that by means of bacterial vaccines we have the power of raising the antibacterial power of the blood and thus overcoming every disease due to bacterial agency. The procedure was made attractively complete by the description of the opsonic index determination, by means of which we could definitely determine the degree of opsonic fault, the degree of result obtained on treatment, and learn the time when the injection of vaccine should be repeated. Experience has taught two things: the limitations of vaccine therapy and what seem to be good reasons for this, and that the opsonic index determination is inconstant and impracticable.

One of the first things taught by Wright was that when you have a local acute or subacute or chronic lesion without acute systemic infection, you will invariably find that the opsonic value of the patient's blood serum for this organism is reduced as compared with the opsonic value of a normal person for the same organism; and that the use of the vaccine would temporarily still further reduce this opsonic value, producing the "negative phase," which would be followed, however, by an increased opsonic value, or the "positive phase," both phases lasting for longer or shorter periods, the degree varying not only in different patients, but in the same patient, according to the dose. These are the cases in which vaccine therapy is useful.

On the other hand, in cases of acute systemic infection, a high opsonic index is the rule; in other words, the patient's serum contains more opsonin than the normal individual. The reason that no benefit is obtained from the vaccine under these

circumstances is not that there is not ample opsonin in the blood serum, but that the body cells are exhausted and can form no more antibody. It is antibody they want, not opsonins, and antibody cannot be introduced by injections of bacterial vaccine. That is the reason why vaccines are not only useless, but are even contraindicated in cases of acute systemic infection where there is a bacteremia. Another statement Wright made in the beginning, which is interesting and which applies here, is that the opsonic value of the blood serum will increase only in case the patient's resistance is proper; provided the patient has the power to react; and that ought to be constantly in mind when considering the use of vaccines. The opsonic power will increase only if the patient has the power to react, in other words, has the ability to form antibody.

Concerning the value of the opsonic index determination, the speaker begged to differ with Dr. Dwyer. He has labored with it for a considerable period of time, and in his hands it has certainly proved impracticable and inconstant. At one time he was very much interested in what had the indications of becoming an exceedingly useful diagnostic procedure and followed the work, not of the hospital interne or novice in laboratory technic, but that of skilled and well drilled men who were doing nothing but laboratory work of high order. He has seen such men at work, side by side, observing each others' technic and watching for faults, and still the results could not be compared, though the material was obtained at the same time by all and worked over by all with as nearly uniform technic as possible. Not only that, but the trial was made to distribute the same material to workers in Baltimore, Philadelphia and Boston, and the results varied widely on each trial. This work was not done carelessly or by novices, but tests were made by well trained, skilled men, several of them pupils of Wright, who were seriously giving their best attention to the trials, anxious to have them succeed, as the procedure would be of the greatest usefulness in guiding the users of vaccine therapy, and to it could be ascribed a good portion of the success attained. Even in the days when the opsonic index was looked to for the indication in the use of vaccine, the proper clinical indication was always accepted if the two did not agree. This is the stand we must take to-day. Most of the recent writings on this point cover it very well, but because there is

some question, at least concerning the value of the opsonic index, this does not necessarily limit the usefulness of the vaccines, though their successful use demands the closest expert clinical observations.

Another very important and valuable point was made by Dr. Dwyer, concerning the cases in which there is a mixed infection with tuberculosis. Thomas of Philadelphia in a recent paper in the *Journal of the American Medical Association*, makes mention of this fact. He says that in his experience there is frequently, together with the tubercle bacillus, a streptococcus or a staphylococcus infection, and in some instances at least, the fever seems to be due to this complication. If the streptococcus or staphylococcus infection is removed first, and the tuberculosis vaccine then used the outcome is often very satisfactory.

Dr. Dwyer had mentioned a number of cases of pyocyaneus infection, and Thomas described others in his article, no result being obtained from the use of vaccines. This would seem explained by both Dwyer and Thomas in their articles. An article was recently published concerning pseudodiphtheria vaccine used in cases of middle ear disease without result. In these cases an antitoxin would probably be more useful than a vaccine. Many interesting points have been discussed concerning the pneumococcus. Dr. Dwyer had mentioned one case with a chronic pneumococcus infection which did well after vaccine treatment. A virulent pneumococcus, a truly virulent pneumococcus, it is claimed, is not acted upon by opsonin and is not taken up by the phagocyte. A nonvirulent pneumococcus is frequently found in pyogenic processes and is taken up by the phagocyte, and its vaccine would certainly increase the phagocytic action. There is another interesting article which has appeared, in which it is claimed that the use of tetanus antitoxin, diphtheria antitoxin, antistreptococcus serum, etc., increases the opsonic value of the patient's blood. These sera do not contain opsonin, but they contain substances which may be converted into opsonin or which stimulate the formation of opsonin. In determining the dose to be used and the interval between doses, painstaking clinical observation is essential. It is also well to remember Wright's original statement that the best value is obtained by having the positive phase as continuous as possible, with as little negative phase interruption as

circumstances will permit. Every dose produces a negative phase or diminution in opsonic value, its degree and duration depends somewhat on the dose. Then it rises and remains above normal for a longer or a shorter period. Large doses seem to make a long negative phase, and while the positive phase is high it seems to be of short duration. Dr. Dwyer's caution not to use doses too large thus seems justified. Keep to the dosage that Wright and others have used and advised. Some days ago I learned of a vaccine being used which contained streptococci, staphylococci, pyocyaneus, and pneumococci in one dose. A combination of this kind is not to be recommended. If different vaccines are to be used in one case they should, I believe, be tried one after another, instead of combining them in this way.

A word in regard to the value of the autogenous vaccine. There is no doubt that the autogenous vaccines will show better results than those made from stock cultures. Published experience would seem to indicate that one is not justified in using a stock vaccine except in cases of tuberculous or gonorrheal processes, where the difficulties of making the autogenous vaccine and the time it takes to produce it are the only arguments against autogenous and in favor of stock vaccines.

DR. SAMUEL LLOYD said that he had come this evening hoping to get some information on the subject under discussion, and he had been abundantly paid. The paper read to-night is one of the best that he has heard in a very long time. The subject had been covered so thoroughly that little remained for discussion. He had spent a good deal of time during the day in looking up his own clinical histories at the hospital and in preparing some criticisms of the treatment with serum, from his experience with different preparations, but the writer of the paper had met them all, and consequently the notes he had brought in his pocket would have to stay there.

The question had been covered in such a well balanced way that he could only approach it by speaking of his own experience with vaccines and with Hiss' serum, rather than on the general phases. In his hospital services they had started using the stock vaccines, and they had exactly the experiences brought out in the paper, and by Dr. Sondern—a remarkable lack of uniformity and in results, and frequently a lack of any result at all—and they almost reached the point of discontinu-

ing treatment. They also had the experience of using it in cases of general sepsis, bacteremia, only to find that they were getting into deeper water all the time, some of the patients dying sooner, he believed, than if they had been let alone.

Then they changed their plans and adopted the autogenous sera, and for the first time began to get satisfactory results. During the last few months in his last service at St. Francis' Hospital, in his private work, and in some of the work during his present term of service at the Post-Graduate, he has had some remarkably good results by using the autogenous serum, and he is convinced that that is the thing.

He has had better results with the gonococcus serum in the stock than with any of the other sera; it would seem that the gonococcus serum was the most efficacious, but they got no results in specific vaginitis cases in children until they began to develop an autogenous serum, when some improvement was noted. This phase of hospital work interests all, for it is very difficult to keep the children free from that infection; and if the slight experience that he has had with this in the last few months is borne out by future work along the same lines, it will be the first indication that he has had in his whole professional career of anything that would thoroughly control the infection. All that he had to say was only in the way of congratulation and corroboration of what had already been said.

DR. HASKIN said that both Dr. Dwyer and Dr. Sondern had stated that the bacillus pyocyaneus had been unsuccessfully treated by vaccines. In the *Journal of the American Medical Association* of February 26th, 1910, Lieut. A. C. Christie, U. S. A., in the Philippines, reports eight or nine cases of middle ear disease, chronic cases, which had been treated in every other way: finally he made vaccines and treated them, using pyocyaneus vaccine in four cases. Invariably, at first, there was a very strong reaction and great increase of the symptoms and secretion, but this was followed by practically drying up and cure.

These same cases of pyocyaneus infection have been greatly benefited, in Dr. McKernon's clinic at the Manhattan Eye and Ear Hospital. In a number of cases where they had been treated for months with bichlorid, boric acid, resorcin, and every other known chemical, without any result whatever,

they started three or four months ago by washing out the ear with plain water, thoroughly cleaning the ear, and then filling it with massolin and allowing it to remain for fifteen minutes before wiping it out. The results have been remarkable. In half a dozen cases where the radical mastoid operation had been performed, and where there was still secretion, under this treatment the discharge had ceased. In one case a patient with a large polyp, suffering with diabetes mellitus, had been treated by having the polyp cut off and massolin applied, and in four days the ear was free from discharge and has remained free ever since. It does not cure caries or necrosis; but for clearing up offensive secretions and restoring the ear to a clean aseptic condition it has worked better than anything he has used for fifteen years.

DR. DWYER, in closing the discussion, and referring to what Dr. Sondern had said about the opsonic index, said that in any case where it is a question whether to go by the clinical symptoms or by the index, one should be governed by the clinical symptoms. The index does give something to go by in the majority of cases; you cannot compare what occurs in the test tube and what occurs in the body, but it certainly is an aid in those clinical cases we are called upon to treat. Wright has receded from his original position on that subject—that is, the all-importance of the opsonic index. Regarding mixed vaccines, in addition to giving them separately, he said that it is better to grow them separately— isolate them on plates—for one variety will grow much more rapidly than another; and if grown together, we may think we have the proper dose of each, when it may be composed of practically one vaccine, the other growing much more slowly.

What Dr. Lloyd had said about the stock vaccines proving more satisfactory with the gonococcus than the autogenous vaccines was very interesting. That has also been his own experience. In two cases he used the stock vaccine entirely; in another case he started with the autogenous vaccine, and obtained no result; he then changed to the stock vaccine and obtained a cure. He could not say why. This is contrary to what is generally found when using autogenous and stock vaccines.

NEW YORK OTOLOGICAL SOCIETY.

Meeting of November 22, 1909.

DR. JOHN L. ADAMS IN THE CHAIR.

Congenital Syphilis With Congenital Nystagmus.

DR. W. C. PHILLIPS reported the following case: H. D. F., aged 16 years, white, a student.

Family History.—Mother, Russian, aged 42 years, uneducated. Says she has always been in good health. Gives history of nine pregnancies, with six miscarriages, five occurring prior to birth of patient. During sixth pregnancy mother was given pills for eight or nine months by her physician. The next (seventh) pregnancy terminated in a miscarriage. The eighth and ninth pregnancies, children born at term, apparently healthy and well developed.

Father, Hollander, aged 43 years, educated, intelligent. Says health has always been good until four or five months after marriage, when an eruption appeared which was pronounced syphilitic. It was then learned that his wife had contracted syphilis some four or five months prior to their marriage.

Past History.—Patient born at full term, was small, weighing four pounds. Had blisters on soles of both feet. Since childhood her health has been fairly good. She had measles and pneumonia when seven, pertussis at ten, and was operated for enlarged tonsils when eleven. Has had spontaneous nystagmus, disturbance of equilibrium since birth and has been extremely nervous since childhood. Has always had nasal obstruction, difficult breathing and nasal speech. Development has been normal and she seems well nourished and in good health. Has attended school and made fair progress. She gives no history of previous ear disease or disturbances of the aural functions. Wasserman test, made some time after treatment commenced, was negative.

Blood Examination, November 27th, by Dr. Coffin.—Erythrocytes 4,270,000; hemoglobin 70-80; leucocytes 7,000. Dif-

ferential count: Polynuclear 74; large lymphocytes 4; small lymphocytes 18; eosinophiles 0; other forms 14. December 9, 1909, the Wasserman and Noguchi complement-fixation test was made and found to be negative.

Examination of urine, normal.

On the morning of November 4, 1909, when she awakened, she complained of pain in the right knee and ankle, and she could not use her right arm and leg as well as on the opposite side. She complained also of vertigo, tinnitus, deafness and also of hearing her own voice when speaking. The deafness increased rapidly and became marked, especially in left ear. Had no headache, pain or fever. Appetite good, bowels regular, sleeps well, but more nervous than usual. When walking she staggered to the right side.

Examination.—Right knee and ankle swollen and painful to the touch, but no redness. Temperature and respiration normal, pulse accelerated. Slight muscular weakness of right arm and leg. Sensations normal, reflexes all exaggerated. Examination made some days later, patient standing with feet together and eyes closed, swayed to left, but feels as though falling to right side.

Examination of Nose and Throat.—Marked deflection and spur of septum. Turbinates hypertrophied. Adenoids and post-pharyngeal catarrh. Uvula and portion of soft palate gone, and latter adherent to postpharyngeal wall on left side.

Ear.—Right membrana tympani retracted, normal color. Left membrana tympani congested and infiltrated. Both eustachian tubes patulous and easily inflated.

Functional Tests.—Weber fork heard right side. Rinné negative in both ears. C² fork heard in left ear by air and bone conduction. C fork by bone only. Moderate voice heard in right ear 3 feet; whisper not heard. Very loud voice heard in left when close to ear. When Barry's Voice Apparatus is used in right (good ear), neither loud voices, tuning forks nor voice can be heard in left, showing total deafness in left ear.

Caloric Test.—Hot and cold irrigation of left ear gave no reaction. Hot irrigation of right ear increased nystagmus to right, and cold to the left side. The quick component, however, always to right side. Nystagmus increased when eyes turned to extreme right, or left, or upward and downward, stopping some after fixing eyes on object in central field of vision.

Subsequent History.—Patient developed an arthritis in both knees and ankles, which increased in severity, and she was admitted to the Post-Graduate Hospital on November 26th, where she was kept under close observation. The arthritis was severe, affecting both knees and ankles, which were greatly swollen, painful and tender to the touch, but little redness. Temperature 101° to 104° , pulse 120, respiration 28. This continued for seven or eight days, when temperature became normal and remained so. There was stiffness and partial ankylosis of both knee joints, which soon passed off as the disease abated, and massage and passive movements were used. During this period she developed a rash from the iodid of potash.

Medicinal Treatment.—Mercurial inunctions (1dr.) once daily. Saturated solution of potassium iodid m. x. t. i. d., rapidly increased. The mother, misunderstanding the directions, gave the inunctions three times a day, and patient became thoroughly mercurialized in about four days, when mercury was stopped. She was then admitted to hospital. Pilocarpin hydrochlorate was now given twice daily and increased until its full physiologic effects were produced (gr. $1/15$ to $1/8$), and this was continued for 10 days. The arthritis still keeping up, pilocarpin was stopped and salicylate of mercury $1/10$ gr. given hypodermically every other day, and the potassium iodid again given and rapidly increased to m. 75 t. i. d. She was given massage daily and hot applications were made to her swollen joints. The legs were drawn up, and her knees could not be extended without causing severe pain. There was rapid improvement of the joint affection, and she was able to leave the hospital on January 7th. She has since been under the care of Dr. Schoomacker. Her hearing in the right ear had much improved, but the deafness in left ear remained unimproved. Soon after returning home she developed a keratitis in right eye, for which affection a solution of atropin sulphate (grs. ii to oz. i), two drops, instilled in eye. It was given three times a day until pupil became thoroughly dilated, then continued once a day. The iodid was rapidly increased. Patient was now given succinimate of mercury (gr. $1/8$) two to three times a week, and the iodids increased to 120 m. three times a day. After a few days of this treatment she improved rapidly. Her appetite

became good, she slept well, gained in weight, and her disturbed equilibrium improved. Her right ear also is much better, but the left is not improved. The iodid of potash was now increased to 140 m. three times daily. She continued improving in every way except the hearing in left ear, which is totally destroyed.

Neurological report made by Dr. Zabriskie showed the chief complaint was stiffness of legs, apparently due to local joint changes. Also great vertigo on extreme position of eyes and staggering. Vesical and rectal functions were normal, and her stomach condition seemed to be a purely localized affair. On examination we found that she appeared to be normally developed and well nourished. Attitude was one of uncertainty, head and occiput inclined to right shoulder. Facial innervation equal on both sides. Marked lateral and vertical nystagmus. Also decided interference with the conjugate ocular movements and a tendency to inward rotation of the right eye. Tongue protruded in the median line, normal. The gait was uncertain and slightly staggering, but not distinctly titubating in character. Rotation of the head in any of the planes produced no marked effect on the station. No ataxia of the arms or gait. Romberg absent, but a rather broad base was necessary for the maintenance of the erect posture. That is, she was unable to stand quietly with the feet close together. The tension reflexes were all exaggerated, but no clonus or Babinski phenomenon were present. Sensory disturbances, either deep muscular or cutaneous, could not be demonstrated. Mentality fair, average intelligence.

My conception of the case is one of congenital syphilis, while there are most probably irregularly disturbed foci throughout the brain, with developed mental deficiencies, at all events, in that region of the tegmentum, which serves as the connecting pathway from the third nerve nucleus to the cerebellum. There are also undoubtedly atropic changes in the cerebellum itself.

Examination of eyes by Dr. Woodward shows latent congenital nystagmus. When not congenital, such nystagmus may be due to lesions of internal ear. Right eye, bluish exudate on margin of optic disk and associated membrane and blurring of retina. Retinitis. Optic disk in moderate stage of yellowish white atrophy. Left eye, some endarteritis and blurring

of the retina. Retinitis believed to be specific in character and congenital type.

DISCUSSION.

DR. GRUENING said that these cases of congenital nystagmus were not at all rare, for he had seen many cases. Congenital nystagmus was usually associated with albinism. The fact that there was nystagmus present did not entitle one to make the diagnosis of syphilis.

The question of operation in these cases was a very interesting one. Should they operate or not? There was a diagnosis of suppurative labyrinthitis made; but in many cases of this nature there was no suppuration whatsoever. In many cases there were symptoms of labyrinthitis, but the condition of the patient could not be improved at all by operation. In these cases there was no doubt but that the labyrinth was involved, but that did not necessarily mean that there was any labyrinthine suppuration present.

DR. DUEL said that most of the men who recently had written upon this question of nystagmus in connection with aural disease believed that the oscillatory movements seen in this type of nystagmus were not in any way connected with vestibular irritation. Nystagmus of vestibular origin was characterized by slow oscillations in one direction, followed by a rapid return to the normal position. In the case presented there appeared the type which was seen in all albinos.

DR. ALDERTON believed that in such cases there was a chronic inflammation of the endosteum, with development of new osseous tissue, and, therefore, operation would be of no benefit.

DR. BERENS asked Dr. Phillips what treatment the patient had received.

DR. PHILLIPS replied that the patient had been in the institution only six or eight days and was under mercurial treatment by inunctions. He asked if many of those present had any such cases, and that they give him suggestions as to the giving of mercury and iodid of potassium in such cases.

DR. GRUENING said that he had seen a number of cases of this kind, and treatment of any kind did not avail. The deafness would persist, in spite of any treatment employed.

DR. MCKERNON reported the case of a child, eleven years of age, in whom hypodermics of bichlorid of mercury were employed. There was absolutely an absence of anything in

the way of air conduction. The deafness began when the child was seven years of age. Besides the bichlorid of mercury injections, pilocarpin was given. During the past year the patient had become practically deaf. Treatment had been continued for about eight weeks, and she had improved to such an extent that she now could hear loud conversation at a distance of eight feet.

DR. HARRIS said that there was one particularly discouraging feature in the care of these patients, which is that we occasionally get a temporary improvement. He recalled one case seen by Dr. McKernon with him; in this case a very excellent improvement in hearing was obtained by the use of hypodermic injections of pilocarpin, given with the mixed treatment of mercury and iodid of potassium. This improvement in hearing was maintained for weeks. The patient could hear ordinary conversation very well. In this case, however, treatment proved to be of no permanent avail. It was a recent case, and the mixed treatment was used.

DR. MCKERNON said that the case he referred to, when away from observation, drank heavily and stopped the medication. The result was that the deafness returned on these occasions.

DR. BERENS reported a case seen by him four or five years ago. The patient was a girl, about eighteen years old, who improved rapidly under large doses of iodids. He started in with the mixed treatment, the protoiodid of mercury and iodid of potassium. He finally stopped the mercury and gave enormous doses of iodid of potassium. One ounce every day was given; this was continued for two or three months. This patient improved very much; in fact, the improvement was very marked. This patient for a time was lost sight of, but returned because of again becoming deaf. Bone conduction was entirely lost. Under treatment this patient again improved, but not as rapidly as when under the first treatment. This patient was under observation for about two years.

DR. LUTZ asked if Dr. Berens remembered the case of a man with labyrinthine syphilis, in whom improvement followed the administration of large doses of iodids.

DR. BERENS replied that the secret of success in these cases was the giving of large doses, and the only way to get the stomach to tolerate these large doses was by giving the iodids

diluted and on an empty stomach; he advised giving the iodids well diluted one hour before meals, making sure that the stomach was empty. This had been his custom since he was an interne in the Philadelphia Hospital, where they received and treated many cases of syphilis. It was the custom of Dr. Charles K. Mills and Dr. H. C. Wood to give these enormous doses; as much as one hundred and sixty (160) drops of the saturated solution of iodid of potassium were given three times a day without upsetting the stomach at all.

DR. GRUENING said that the question depended upon whether the deafness was absolute or not; if there was any hearing left, they should treat the case; but if the deafness was absolute no improvement would follow treatment of any kind; if there was the least remnant of hearing the case should be treated vigorously. He usually gave the iodids in large doses before meals in syrup of ginger.

DR. BERENS believed that the action of the skin should be considered when giving these large doses of the iodids, using hot baths, blankets and other resources for producing sweating.

DR. MCKERNON said that the pilocarpin treatment should be employed as long as one could do so without depressing the patient. He said he had used this treatment twelve weeks at a time. This patient was not under his direct observation, but under that of another man.

DR. DUEL believed that in such cases they should not despair of getting relief; such cases of syphilis, when seen early and directly after the acute attack, should be treated vigorously. He recalled a case of this nature. The patient had a sudden attack, during which he became unconscious for a time. It was a very well marked case of syphilis. After the patient recovered consciousness, there was complete deafness of one side. The patient was unable to hear any tuning fork or even the Galton whistle in that ear. Dr. Duel then gave him enormous doses of potassium iodid. He made a quick recovery from his unconsciousness, but for some time had vertigo and a staggering gait. At that time he had nystagmus. No very careful notes of the case were taken, for at that time there was not such a deep interest in nystagmus in connection with vestibular irritation as at present. A note was made, however, of the peculiar jerking of the eye. Ail despaired of getting

even fair hearing in that ear. This patient was seen four or five years ago. Dr. Duel saw the patient last year, and found that he had fair hearing and perfect equilibrium. He still at intervals takes what he terms his "cocktail" of iodid of potassium, one-half ounce doses. He took this several times a year for a period of some weeks. At the time when he had this very pronounced attack he had taken one and a half ounces a day of iodid of potassium for several weeks.

DR. ALDERTON said he had under observation a boy, thirteen years old, who had been taking for quite a while one and a half ounces of the iodids, which he tolerated very well. At last, however, he had to stop these large doses because of considerable irritation of the nasopharyngeal mucous membrane, tube and middle ear. The patient recovered from all these upon stopping the iodids.

DR. QUINLAN said that, apropos of the discussion on syphilis, he had a patient under observation who came to him two years ago ataxic and with a very obstinate lesion of the internal ear. He was so absolutely deaf he had to give up his business. He was assisted in walking by members of his family; he was unable to do anything at all, and he despaired of ever being able to return to business. Unguentum hydrargyrum, in half-dram doses, was given by inunctions according to the classical plan, each night, employing the inunction on different portions of the body. He came for observation every two weeks. At first he could hear the acoumeter at one foot, whereas now he could hear it at fifteen feet. He was also given seventy-five grains of iodid of potassium three times a day. Every other night the patient took a hot bath. This patient had been absolutely deaf for two years, and had to abandon everything during that entire period. His hearing was now restored, his ataxia was greatly improved, and he had been restored to health and able to look after his business by this vigorous treatment. Dr. Quinlan thought that sometimes we despair of these cases, but by giving the patient full doses of this sheet anchor improvement takes place. In this patient the administration of such large doses of the iodids, together with the inunctions of mercury, not only did away with the pseudoataxia, but reestablished the other physiologic conditions. The consideration of cases of this kind was well worthy of their notice.

DR. TOEPLITZ asked Dr. Duel in what stage of syphilis his patient was.

DR. DUEL replied, in the tertiary stage.

DR. TOEPLITZ said that in 1893 he published a paper in which he reported the case of a man in which syphilis was discovered after an examination of the ear and the hearing. The patient was a physician who walked into the hospital and asked that his ear be examined. Dr. Toeplitz found a considerable lowering of hearing in the left ear, but could not make the case out. After two days the hearing in the other ear became lowered. Examinations were made with tuning forks. The patient lost the high notes, and this made him suspicious. Dr. Toeplitz asked the doctor if he had other signs of syphilis. He learned that the doctor did have a primary lesion of the middle finger of his left hand. Upon further inquiry he found that in the gynecological work of the colleague patient, examinations were made with the left hand, and in this way syphilis has been contracted during such examinations. He appeared to be in the second stage of the disease. The case was published in the *New York Medical Journal* in 1893 as one of the earliest cases of otitis interna in the course of syphilis.

DR. DUEL wished to add that they need not despair of their treatment in these cases of syphilis. One particular man he referred to was an eminent surgeon. He had despaired of the man's life; and in view of the remarkable success that had attended the exhibition of large doses of the iodids in syphilis, the man was asked to practically drink iodid of potassium—pitchers of it. Only last year he had the pleasure of sitting at this man's table. He was now a surgeon and at the head of a hospital. He played golf and was in perfect health.

Case of Brain Abscess.

DR. JAMES F. MCKERNON presented a patient upon whom he had operated for brain abscess February 9th, eight years ago, when she was twenty-one years of age. This abscess was upon the left side, and apparently was the result of an attack of purulent otitis following measles, which she had when she was one year old. For five years she had gone on without any apparent trouble except an occasional outbreak of discharge from the ear. The lower part of the drum membrane was absent and showed the lining membrane of the tympanic wall.

Here was a woman, twenty-one years of age, who had a purulent discharge from the left ear following an attack of measles. On the 8th of February, when Dr. McKernon saw her, she was in a state of stupor; she could be aroused, and then would moan a great deal and gritted her teeth. Her hands were closed, even clenched. There was intolerance to light. The pupils were negative.

An examination of the external auditory canal showed it to be plugged with a large polypoid mass, which was bathed in thick greenish secretion of a very foul odor. A tentative diagnosis of brain abscess was made. The temperature was 97.2° and the pulse 52.

Dr. McKernon again saw her the following day in consultation, when she was decidedly in a state of stupor, advised operation, which was done that same afternoon. He found a large cholesteatomatous deposit in the mastoid antrum. There was a perforation through the antrum in the middle fossa, and there was also a perforation up through the zygoma and roof of the tympanum. The middle ear was practically filled with this cholesteatomatous deposit. He enlarged the opening posteriorly and made a large oval window between the attic and the mastoid cavity, cutting away a portion of the posterior wall. The dura was markedly darkened. When he removed the bone and exposed the dura, the dura bulged into the opening. He then enlarged the opening anteriorly, completely across to the angle of the eye and well back, thus exposing the temporo-sphenoid lobe at its lowest level and as far back as its posterior tip. He evacuated a large amount of pus from this brain abscess. There was a distinct lining membrane to this abscess cavity.

Instead of using the method he formerly employed, irrigating the abscess cavity with normal saline solution, he simply separated the parts with two blunt retractors, and mopped out the abscess cavity with sterile gauze, and then inserted two drains of gauze. These drains were inserted to the deepest part of the abscess cavity. For ten days the patient made an uneventful recovery; then she had a slight rise of temperature to 100.5° , she became irritable and restless and her pulse, which had been 90, fell to 62. The examination of the eyes was negative. Dr. Rae was present, and believed that this was a case of multiple brain abscess. The retractors were

again passed in; blunt forceps were inserted into the posterior portion of the wound, and half an ounce of pus was evacuated. This pus was not foul in character, showing it was of recent origin. No multiple abscess cavities were found. The wound was dressed again in the same manner as at the first operation. After ten days the drain was withdrawn one-half an inch at each dressing until the sixth day, when it was entirely removed. Then a small wick was passed in. The patient then made an uneventful recovery, with only occasional attacks of vertigo.

There had been a great deal of criticism as to the best method of draining such abscess cavities, whether they should use sterile gauze in removing the pus or employ irrigations. He thought, however, that most men to-day used the dry treatment in such cases. The point he wished particularly to emphasize was that in the repair of these abscess cavities it was not wise to handle them too much at the time of the operation or at the subsequent dressings.

DISCUSSION.

DR. GRUENING said that it had been maintained by most men that the proper thing to do was to drain such abscess cavities. He could see no reason why there should be any objection to employing direct drainage from below. The abscess cavity should not be syringed, but should be treated dry. This was the plan he followed. Dr. Gruening asked if there was an optic aphasia in the case reported.

DR. MCKERNON replied that there was none whatever. Most of the destruction was in the anterior portion of the temporosphenoidal lobe.

DR. GRUENING said that recently he had been called to see a case. The patient was a man, with a temperature of 105, but this varied greatly, sometimes being normal and then again going to 105. With the high temperature he had a pulse of 80. He had optic aphasia. When he was shown a watch and was asked what it was, he would reply that it was to tell the time, but he would not say it was a watch. When he was shown a pencil and was asked what it was, he would reply that it would write, but he would not say that it was a pencil. Operation was performed, and an abscess of the temporosphenoidal lobe was found. This was treated by the insertion of a gauze drain.

The patient got well of the abscess, but the temperature remained high. Then the sinus was explored. The blood culture was negative, but a negative blood culture did not, in his opinion, tell the story. The sinus was found to be filled with pus. After its evacuation, the patient made a good recovery.

In this case there was a combination of sinus thrombosis and an abscess of the temporosphenoidal lobe. Optic aphasia was very pronounced in this case. These patients with optic aphasia speak fluently of things what they do not see, but are unable to name the objects held before them.

Presentation of a Noise Producer.

DR. WENDELL C. PHILLIPS presented this instrument. Neuman had devised a noise producer which was operated by electricity. The one presented had to be wound up, and served the same purpose.

In the case presented by him, the girl could hear bone conduction in her left ear; but she could not hear ordinary sound.

Neuman's instrument was a more elaborate one and more useful instrument for testing patients for deafness.

DR. GRUENING asked what it accomplished.

DR. PHILLIPS replied that it absolutely cut off all sound.

DR. DUEL called attention to the method of making a diagnosis of complete deafness on one side.

A Case for Diagnosis.

DR. HENRY A. ALDERTON asked for aid in diagnosis. At the Nassau Hospital, on the 10th of this month (November), a girl of about eleven (11) years was operated upon under his supervision for cholesteatoma of the middle ear. The operation was quickly and well done, and a perfect view of the horizontal semicircular canal was obtained. A small area over the promontory showed the presence of granulations. The bone was intact and very hard. There apparently was no fistula. For three days after the operation the child did well, but on the fourth day she developed a temperature of 102.2. The temperature dropped the next day to 100, and again it went to 102. The next day it was 99.2, and again it rose to 101.2. The temperature then, with slight variations, rose to 103.6. The child complained of soreness of the sternocleidomastoid muscle. Otherwise she seemed to be in fair condition. At times

she had a little headache. The pupils were normal. Her general condition was fairly good. The wound was dressed a number of times and looked fair. The posterior wound was stitched at the initial operation. There did not seem to be any tumefaction around the wound, still the stitches were removed and the wound redressed. The temperature kept along about 103 plus, up to 104, but it did not drop to normal. The patient was gone over carefully by the family physician, and nothing wrong was detected except a heart murmur, which had not been found before. Two internes had examined the patient before the operation, and they were not able to tell whether the murmur was present or not. This temperature continued until the twentieth, when it rose to 104.4. The blood count varied. The percentage of hemoglobin was 92.75; the white cells numbered 12,800. The differential count showed the polymorphonuclears to be 67.1% and the transitionals 6.2%. Not having been able to find any apparent reason for the temperature except by exclusion, and, thinking there might be some trouble in the sinus, he uncovered the sinus nearly to the jugular bulb, and found conditions there normal. After this operation the temperature ran up again and was now 104. The child now for the first time showed evidences of a pneumonia.

The question arose whether this was a septic pneumonia or a central pneumonia. The length of the case with such a temperature before the development of the pneumonia seemed to preclude the idea of a central pneumonia.

DR. GRUENING thought this was a case upon which light could be thrown by means of a blood culture. If there was a positive blood culture, likely there was something in the jugular bulb or in the sinus. These were the cases where the taking of a blood culture was very useful. He also thought it was rather doubtful whether it was advisable to close these wounds; in such cases he believed the wound should be kept open.

He said he would like to know what treatment the other gentlemen would have employed; whether it was customary with them to close such wounds immediately or not. He had come to treat these cases of cholesteatoma as open wounds.

DR. ALDERTON said the cholesteatoma seemed to have been confined to the antrum and middle ear. It was two years ago

that Dr. McKernon had laid particular stress upon the discoloration of the bone over the sinus in such cases, in the discussion of a case, reported by Dr. Alderton, in which such discoloration existed, and which was operated and found to have a thrombosis. When they came to scrape away the granulation tissue they found the bone absolutely healthy. After taking away the inner table the dura appeared with normal gray color. He had not seen a case of jugular bulb infection without discoloration or thickening.

DR. GRUENING said he took exception to the statement; he did not think the appearance of outer wall always indicated the condition of the sinus.

DR. DENCH said that it was his practice to close the wound over cholesteatomatous cavities. If the cholesteatoma was thoroughly cleaned out, he could see no reason for not closing the wound. He never had any bad results following this course.

DR. GRUENING said that when a cholesteatoma was invested with a membrane, this membrane penetrates into the interstices of the bone and was difficult to remove, and there was likely to be a recurrence of the condition. Better results were obtained by the open wound than if the wound was closed at the time of operating. Of course the treatment lasted longer, but the results were better. Dr. Gruening had seen recurrences of the cholesteatoma when the wound was closed.

DR. MCKERNON spoke of the difficulty in determining whether or not there was a blood current in the sinus. He had met with two such cases during the past year. One was with Dr. Whiting; he operated last spring, uncovered the sinus, because of an irregular septic pus temperature. Nothing whatever was found, although he uncovered the sinus at length. Dr. Whiting said it did not look involved. However, it was incised, and it was found that no blood whatever came from it, and he extracted a large clot. He said he had seen two other similar cases, both occurring in children under six years of age.

With regard to the open wound in cases of cholesteatomata, if one thoroughly cleaned out the mass, then the wound should be closed. He usually closed such wounds and had had no reason to be dissatisfied.

DR. DUEL said that in these cases of cholesteatomata few were able to get all the masses out, no matter how thorough

an operation was done. One should not make it an absolute practice to close these wounds; if they did, they would make a mistake, although he had scraped out such masses, closed the wound, and with good results.

DR. TOEPLITZ believed that in cases of cholesteatomata, leaving a permanent opening was better than closing the wound at once. One patient who had been coming to see him for about five years had two mastoid operations performed by others, nine and thirteen years ago, respectively; on the return of the cholesteatomatous condition, he was successfully operated with a permanent opening, and now, after five years, refuses to have the wound closed.

DR. GRUENING said that the immediate results in these cases were not at all satisfactory. His own cases had interested him very much. He learned more from his failures than he did from his good results and successes. In a number of cases he had failed when he made an immediate closure of the wound, and that led him to treat his cases by the open wound, although this was not quite satisfactory to the patient at the time.

DR. LEWIS said that if the radical operation in cases of cholesteatoma was performed so as to leave no ridge between the external auditory canal and the excavated mastoid cells, and the meatal opening was sufficiently large, these cases could be managed as well if not better than through an opening back of the auricle, without the disadvantage of disfigurement.

DR. DENCH asked Dr. McKernon if the sinus aspirated on inspiration.

DR. MCKERNON replied in the affirmative, and said that in these cases it was very marked.

DR. MCKERNON said there was a very large area of pachymeningitis present in the case.

DR. ALDERTON asked if it involved the sinus wall.

DR. MCKERNON replied that it was in the middle fossa.

Removal of Inner Plate Covering Middle Fossa and Outer Table of Temporal and Parietal Bones.

DR. ROBERT LEWIS, JR., reported the case of a child who was brought to him about eight weeks after the beginning of an acute purulent otitis media. He found the drum membrane intact, but there were granulations on the posterior wall of the canal just within the meatus, and a sinus which led into the

mastoid cells. At the time of the operation the mastoid was found to be extensively involved, and it was necessary to remove the inner plate covering the middle fossa, as also the outer table of the temporal and parietal bones almost to the parietal eminence. Apparently there was no disease in the middle ear at all; a mass of granulations apparently sealed off the entrance from the mastoid cells into the tympanic cavity.

DR. LUTZ said he had had a similar case. A boy about three and a half years of age, with a history of having had a discharge from the ear for one year. On examination the drum membrane was found to be intact, but there was a small carious spot on the posterior wall; upon probing this, the instrument passed through into the mastoid cells. The mastoid was opened and found to be extensively necrosed. He could not understand how the child could have the condition without complaining of earache. There was a great destruction of bone. He did a radical operation upon him. There were no middle-ear symptoms. The discharge came through a perforation in the posterior wall.

DR. DENCH asked if the perforation was close to the ring.

DR. LUTZ replied that it was nearer the ring than the meatus.

DR. LEWIS said that in his case the perforation was just within the meatus.

Invasion of the Mastoid Cells by *Diplococcus Intracellularis* With Formation of Pus.

DR. STEPHEN H. LUTZ said he wished to make a report of three cases.

CASE 1.—This patient had a chill on a Friday, and on the following Sunday night both drum membranes were bulging, and both were opened that same night. She had a temperature of 104, and extreme pain. She begged for an operation, but the family was opposed to it. She was taken to the Brooklyn Eye and Ear Hospital Monday. A careful examination disclosed a pneumonia of the left lung. Nevertheless she was placed upon the table, and both mastoids were opened. No pus came from either mastoid. There was some bulging and edema over both mastoids. Although there was no pus present, the mastoids were filled with a thick, sticky mucus. Smears from this showed *diplococcus intracellularis* and pneumococcus. This patient made an uninterrupted recovery.

CASE 2.—This patient was a boy, who gave the history of a chill and an earache of three days' duration. The chill occurred on a Saturday, and the drum membrane ruptured Wednesday morning. That same evening the opening was enlarged. At that time there was an outstanding ear. No pus was found in either the mastoid or in the antrum. Smears here, too, showed the diplococcus intracellularis. This patient got well and left the hospital in five days and was absolutely well in ten days.

CASE 3.—This patient was operated upon by the interne. There was a bulging of the drum membrane, extreme tenderness, no chill, outstanding ear and an extreme earache. The drum membrane was incised. There was no pus in the mastoid cells. The wound was at once closed and an uninterrupted recovery followed.

In these three cases the diplococcus intracellularis was found. He asked if those present thought he had opened healthy mastoid or not. Two were typical mastoid cases, with bulging drums and outstanding ears. All went to operation mainly because of the pain.

DISCUSSION.

DR. DENCH asked if there was any pus present.

DR. LUTZ replied that both mastoids had the cells filled with a thick mucus; no pus. In one case the periosteum was adherent.

DR. DENCH asked what was the color of the cells.

DR. LUTZ replied that they were not necrotic.

DR. DENCH asked if they were black.

DR. LUTZ replied no.

DR. DENCH said that if the diplococcus intracellularis was present, there was infection. This was rather a bad germ to find. Since there was infection present, he said he would not have been inclined to sew the wound up.

DR. LUTZ thought such a case would be a bad one to allow to go on.

DR. GRUENING said that he had practiced in the pre-mastoid days, and it was wonderful how many of these cases got well without an operation. If such cases got well without operation in former years, why should they not get well now?

DR. HARRIS asked if pus was found after doing the paracentesis in the case of the nurse, Case No. 1.

DR. LUTZ replied that the pneumococcus was found in the

discharge from the ear, but the diplococcus intracellularis in the discharge from the mastoid. No pus at any time.

DR. MCKERNON asked if there was any encroachment upon the canal itself.

DR. LUTZ replied that there was a bulging of the wall, in two out of the four mastoids.

DR. KENEFICK asked if the condition then cleared up.

DR. LUTZ replied that the ears were still running when the stitches were removed. The discharge from the ears lasted longer than from the back, but only about a week longer.

DR. KENEFICK believed that Dr. Lutz did well to operate early in his three fulminating cases.

DR. GRUENING asked what the temperature was.

DR. LUTZ replied that in the first case the chill occurred on a Friday, three days before the operation. The patient had a temperature of 104, but the chill and temperature both were due to the presence of the pneumonia, he thought.

In the second case there was a great deal of swelling above the ear. This patient had a temperature of 102.4.

The third patient had a temperature of 101.2.

DR. DUEL said that it was unusual for him to meet with these outstanding ears as such an early symptom, unless the infection had extended through the posterior canal wall. In cases of mastoiditis, except occasionally in infants, they were not met with except in the later stages. He asked if the condition was not due to a periostitis which developed from the external canal.

DR. LUTZ replied that he was absolutely sure that in none of the cases was there an infection of the canal or external ear. There was no furunculosis. The outstanding ears in all the cases were marked. In one case there was a patch of edema present.

DR. KENEFICK believed that the postaural glands were affected early in these cases, especially in children.

DR. GRUENING said that he knew from the material he had had at the Mt. Sinai Hospital the glands were involved in cases of otitis and postauricular swelling. It was due to the irritation of the skin. These patients were not clean; they had pediculosis, which caused a dermatitis, and this was accompanied by glandular swelling. Whenever he saw such swelling, he first examined the head.

DR. LUTZ said he had had experience in the same way.

NEW YORK OTOLOGICAL SOCIETY.

Stated Meeting, January 25, 1910.

JAMES F. MCKERNON, PRESIDENT, IN THE CHAIR.

Mastoid Operation With Blood-Clot Closure.

DR. WENDELL C. PHILLIPS presented one patient and cited the cases of two others upon whom he and Dr. J. J. Thomsen had performed the mastoid operation with blood-clot closure of the wounds. He was on record as being not very much in favor of the operation, but in the cases reported the results had been quite satisfactory. The patient presented, a woman, had been operated upon on March 27, 1909. She had had chronic otorrhea of long standing, with subsequent development of mastoiditis. The wound healed by primary union and there has been no return of the trouble. The second case, operated upon ten days ago, was one of acute mastoiditis. The wound closed promptly. There had been no subsequent discharge from the canal. The third case, a little child, was operated upon two weeks ago at the New York Post-Graduate Medical School and Hospital. She had had mastoiditis about six days. There had been a good deal of pain and a profuse discharge, but no external swelling. The purulent involvement was not very extensive, and as the operative field was comparatively small the blood-clot method of closure had been employed. The wound was a very dry one, necessitating the making of incisions into the soft tissues of the wound in order to secure sufficient hemorrhage to close the wound. A cigarette drain was inserted, and this was drawn out a little each day until the wound had closed. At the end of 14 days only a small granulation remained of the post-auricular wound, which was snipped off, and three days later final healing had taken place.

DISCUSSION.

DR. EMIL GRUENING expressed interest in the cases, but could not accept them as cases of mastoiditis. In many years he had not seen a case of mastoiditis that could be closed in

this manner. If operated upon early enough, before the development of mastoiditis, the wound would close. He had never seen a diseased mastoid without hemorrhage. Despite the reports of the brilliant results of Dr. Blake, Dr. Reik and Dr. Sprague, he was still skeptical. He did not believe that the wound in true mastoiditis could be closed in this way.

DR. ARTHUR B. DUEL had operated upon a patient two years ago and had closed the wound by the blood-clot method. Within fifteen days after the operation the woman returned to the hospital with sinus thrombosis, from which she died. Theoretically he had been opposed to the idea of the blood-clot closing of a septic wound, which could never be thoroughly cleaned, especially as the advocates of the method claimed that antiseptic solutions interfered with the phagocytic action of the blood. Hearing, however, of cases in which the operation seemed favorable, he had tried it in the case cited. The wound healed by primary union, and in seven days the patient was apparently cured. A week later she returned with the sinus thrombosis, and, despite prompt tying, and excision of the jugular vein and sinus wall, the patient died. This was a sad confirmation of his previous feelings with reference to the method. The speaker asked if the members of the Society would be willing to have the operation performed upon themselves. The answer to the question was negative.

DR. JOSEPH A. KENEFICK asked if an attempt was made, in cases in which this method was employed, to render the wound free from microorganisms. In acute cases the middle ear is a source of infection which could not be eradicated, and he would like to know if any attempt was made to accomplish such eradication.

DR. LEWIS A. COFFIN had employed the blood-clot method two years ago in a case of chronic suppurative otitis media which had been discharging for twelve years. The mastoid was not infected. The method in this case was a perfect success, the patient leaving the hospital in eight days with the ear perfectly dry. He had also operated by this method upon an acute case. The patient in this instance was well within two weeks.

DR. GRUENING called attention to the fact that it is necessary to eliminate cases of chronic suppuration of the middle

ear and attic from the present discussion. Such cases could easily be closed by this method because of the drainage through the canal. These, however, were quite different from cases of acute mastoiditis.

Dr. McKERNON asked Dr. Phillips if the blood clots were primary in the cases reported. If a drain is employed it is not a primary blood clot. He recalled a case reported to this society in which he had closed the wound by blood clot in acute mastoiditis in a man twenty-seven years of age. Five days later the patient showed all the evidences of sinus thrombosis. He opened the wound and found a clot in the sinus and in the vein.

In reply to a question by Dr. Dench he said that he did not know whether the sinus thrombosis was due to the blood-clot closure of the wound, or whether it was merely a coincidence. He had attributed it to the method of closure of the wound.

Dr. GRUENING said there might be sinus thrombosis with fatal termination without a blood clot, due to infection. The same may be true when the wound is closed, particularly without drainage. He considered the operation unsurgical, and consequently he had never performed it. He would not sew up an abscess in the soft tissues; why, then, should he sew up a bone abscess?

Dr. DENCH had had a certain number of cases in which there was a reaction after closure. In this connection he cited a case of subperiosteal abscess, which, however, made a complete recovery. The result in cases operated upon in this manner is entirely uncertain. A great deal of danger attends the complete closure of the wound.

Dr. PHILLIPS, closing the discussion, emphasized the fact that this operation is applicable only in cases where the disease is not of long standing and not extensive. Before closing the wound he had cleansed it with physiological salt solution. Ordinary sutures were used, except in one or two cases, in which subcuticular or Michel's metal sutures were employed. He considered the method unsurgical in cases where there was pus in the posterior cells or where the involvement was extensive. He agreed with Dr. Dench in the matter of drainage. He had used the cigarette drain in only one or two cases. In the last two years they had recorded

eleven cases, in not one of which had the wound to be reopened.

PRESENTATION OF APPARATUS.

The Vacuum Cleaner—Its Applicability in Routine Office Work and in Operative Work for Sponging. Description of Apparatus.

DR. W. H. HASKIN: For the past seven years I have used suction so constantly in my office it has never occurred to me that others have not found its great usefulness also, but find that my confreres, in New York at least, have not made use of it. The results obtained when used are so immediate and the ease of handling the apparatus is so simple, I think that a simple demonstration of its ability to suck up a raw egg will prove that it will remove any secretion that one will find in the throat or nose. Its applicability rests not only in our daily office work, but it will also be found to be of the greatest service in operative work, both upon the mastoid and in many nose and throat operations. In fact, with proper catheters, I believe that there is a very wide field for its use in general surgery, especially in abdominal work. Vacuum cleaning is being used very extensively in the household; why not apply it also to the body?

I have used the pump of the Wappler Company and that of the Victor Electric Company, and the only addition I have made is the insertion of a bottle between the pump and the site to be cleaned. This secures a constant, uniform suction and prevents the material removed from entering the pump and thus interfering with its action. By having catheters of various sizes one can always reach the secretion, wherever it may be. I have always used the soft silver eustachian catheter, of various sizes, but have suggested to the Wappler Company and the Victor Electric Company that the catheters be made smaller at the tip and gradually enlarged back to the end which is inserted into the rubber tubing, and they are preparing such catheters, with obturators, in three sizes. This will lessen the possible blocking of the tube, as anything that will pass through the tip opening will pass into a larger area at once. If any one will use the apparatus a few times, until he becomes accustomed to it, I feel sure that he will be gratified, and if used regularly it will become invaluable.

With this apparatus the treatment of all suppurative cases

is greatly simplified, for the perfect removal of all secretions leaves the membrane clean for the application of whatever medicament you may wish to use, and you may feel sure that it is not neutralized by the secretions themselves. The edematous conditions caused by the membranes being constantly bathed in these irritating secretions will generally quickly subside, because the action of the drug used is so much more certain. Patients who have been accustomed to syringing and the cotton applicators are invariably delighted and notice the much greater relief afforded at once.

Cases of pansinusitis are especially suited for its use, and I know of nothing that will so thoroughly clean the cases of atrophic rhinitis, although the thick crusts may have to be softened first. In the throat it can be used for removing the secretions in the tonsillar crypts, and it is especially useful in removing the thick, ropy secretions which adhere so closely to the posterior pharyngeal wall and the base of the tongue. The relief afforded in emptying the cavities of peritonsillar abscesses is immediate and aids materially in cutting short the distressing symptoms. In fact, it will clean out any abscess cavity better than any other method that I have ever used. In suppurations of the ear, I cover the tip of the catheter with very small, almost capillary, rubber tubing, which lessens the danger of hurting the patient if he moves suddenly. You all know how difficult it is to thoroughly remove the thick mucopurulent secretions of the ear by syringing or wiping, and will be gratified with the ease of its removal with suction. By using suction, with the Siegel otoscope, after all visible secretions have been removed, one can quickly see just where the secretion comes from and can apply treatment more successfully in most cases. I would like to suggest here that all give a thorough trial of the lactic acid bacillus in the treatment of suppurative ear cases.

I have been using this apparatus in my mastoid operations for sponging, and find that it not only shortens the length of the operation, for you do not have to wait to have the field cleaned, as the suction can be used constantly right at the site where one is working, but also, that when working down in the attic or middle ear, by holding the catheter in the left hand, the operator can secure a perfect field of vision and need have no fear of injuring the foramina or any other dangerous

point, and can work much more rapidly. In the after-treatment of these cases it is of the greatest possible value, for with it one can quickly remove all secretions in the attic and in the middle ear without injury to the delicate new granulations and without pain to the patient. In tonsil and adenoid operations, a little experience will enable the assistant to keep the throat perfectly clean, without necessitating the turning over of the patient or any sponging, and it removes the danger of aspiration of blood and secretion. After the operation, by inserting the catheter into each nostril, all blood and clots can easily be removed from the nose, and the patient is relieved of much of the discomfort which often follows the operation because of the blocking of the nose, and also there is much less nausea, the blood being kept out of the stomach. I have never used it in nasal sinus operations, except on the antrum, where it is invaluable to me, for I have yet to find a case in my private practice where operation was necessary after carefully using suction, sometimes using it twice daily for a short time. In cases where the operation is necessary, because of necrosis, I believe it would prove to be a great aid, not only in the operation, but also in the after-treatment to remove secretions. The catheter can be sterilized, and the fingers cannot, without prolonged scrubbing and washing with antiseptics, and you can readily see how much danger of infecting recent wounds is lessened. I believe that it would prove to be of the greatest value in general surgery, especially in those abdominal cases with abscess cavities, where the danger comes from the infection of the peritoneum. The suction will remove the pus absolutely and rapidly. In ordinary office work it is well to keep the vacuum bottle half filled with a strong antiseptic solution. I use a 1 per cent solution of formalin, and to have the glass tube which is connected with the catheter reach the bottom of the bottle. By this means one is able to reverse the pump and thus force out the secretion and at the same time sterilize the tube. After the secretions have been driven out, it is well to again immediately reverse the pump until you see the air bubbles passing through the water in the bottle. This will keep the water from escaping on the floor. In operative work the tube should be raised above the solution, otherwise the albuminous matter, drawn into the bottle, will quickly be

churned into froth by the air bubbles and, being drawn into the pump, will cause trouble.

In office practice the pump should be placed so that the control and the reverse can be easily reached, and the tube should be long enough to reach your cuspidor, so that it can easily be emptied. In operative work the bottle should be placed near the site of the operation and the tube be relatively short, so that there will be less danger of clotting and thus blocking the tube. I have never had this happen, but there is a possibility, and this need not be taken by simply shortening the tube and keeping it fairly straight. Any pump that will produce a vacuum can be used, but this, which is one of the Wappler Company's earliest inventions, is particularly useful because of the ease with which one can reverse the current and thus keep the tubes clean.

DR. DUEL had used the apparatus once, but from this small experience was favorably impressed. He believed it would prove useful in mastoid work, particularly when canulae were devised which would fit into the bottom of the wound without interfering with the instruments. It cleansed the wound much more quickly than could be done with sponges, and more effectually. It will accomplish in half a minute what it requires five minutes to do with sponges in abdominal work. When perfected he believed it would have a large field of usefulness in general surgery.

DR. STEPHEN H. LUTZ said he had used a Divilbiss compressed air aspirator, which, instead of spraying, as does the ordinary atomizer, reverses the air current and sucks any fluid back into the bottle. He had used this arrangement for a number of years. He had found it useful in sucking material from the eustachian tube. It can be used to clean out the nose, accessory sinuses, blood, etc., working as a suction or vacuum cleaner. This aspirator has been in the Divilbiss list for at least five years. The same thing can be done by the Victor transformer with massage pump, Pynchon model, which gives constant or interrupted suction from two of its four valves.

DR. DENCH thought the suction pump a good thing for removing the air from under the graft in skin grafting.

**Puzzling Case of Otitis Media Involving Differential Diagnosis
Between the Eruption of Streptococcemia and That of Iodoform.**

DR. EDWARD B. DENCH cited a rather puzzling case of otitis media which had come under his observation in the New York Eye and Ear Infirmary. Myringotomy had been done rather imperfectly. The temperature was 101° ; there was no mastoid tenderness. During the afternoon the temperature rose to 102° . When he saw the patient the next day the temperature was normal. He asked that the myringotomy be repeated; this was done, and the operation was followed by a rise in temperature. There was no tenderness over the mastoid at any time. The mastoid was opened and pus found. The wound was packed in the usual manner. That night the temperature went to 105° , and the next day there was an eruption covering the affected side of the face, a part of the chest, and gradually extending until it covered the extremities. On the morning of the second day the other side of the face and the inner aspects of the arms were involved. The eruption was papular in character, and some who saw it diagnosed it as measles. The speaker considered it a streptococcic infection. A culture was made, but no streptococcemia was found. The temperature dropped to 102° , then rose again. The house surgeon suggested that it might be an iodoform rash. The iodoform gauze was removed and the rash disappeared. After the diagnosis of iodoform rash had been made the mother of the patient said the child had an eruption of this kind every year. The differential diagnosis between streptococcus infection and iodoform rash was difficult to make. Another case which had come under his observation was that of a man who at times had sugar in the urine. In this instance both wounds were packed with iodoform gauze. Although there was no rise of temperature above 101° , the man became dull and stupid. The urine became very dark in color and showed the iodine reaction. The removal of the iodoform gauze was followed by a cessation of all untoward symptoms.

DR. HASKIN had reported two cases of iodoform rash two years ago. One, a small child, upon whom the radical operation had been performed, developed a high temperature, with evidences of meningitis, which disappeared on the removal of the iodoform gauze. In the other case, a man, the eruption

was thought to be erysipelatous. When the gauze was removed the rash disappeared. The reason for the frequent occurrence of iodoform rash is probably found in the careless making of the gauze and the use of too strong percentages of iodoform.

DR. THOMAS J. HARRIS raised the question as to whether it were the practice of the members present to use iodoform gauze, and whether as good results were obtainable with plain gauze.

DR. LUTZ formerly used iodoform gauze, but after an experience similar to that cited by Dr. Dench he had abandoned it. Dr. Lutz has used only plain gauze for the last six or seven years.

Sinus Thrombosis With Negative Bacteriologic Findings.

DR. FREDERICK WHITING recounted the case of a boy who had been brought into Mt. Sinai Hospital with a history of having had a discharge from the ear for three or four days, which discharge had suddenly ceased. The parents stated that the child had had two chills and had been apparently very feverish for two days. The middle ear presented an almost entirely negative field. The tympanic membrane appeared thickened, as if it had undergone a suppurative process from which it had recovered. In the anterior inferior quadrant there was a small hernia of the epithelial layer. The appearances of the fundus of the ear did not at all suggest a recent suppurative process, but the boy looked sick, and the temperature was $105+^{\circ}$. There was no mastoid tenderness whatsoever. There was, however, distinct tenderness along the line of the jugular. There was a certain amount of post-mastoid tenderness in the superior part of the cervical triangle. The child looked so sick and septic that it was decided to operate. A blood culture was made. The mastoid was opened, and appeared to be perfectly normal, so far as the macroscopic appearance of the cells was concerned. There was nothing to suggest any suppurative process in the mastoid at the time. The sinus was opened, and on its posterior knee was a small deposit of fibrin. Its area was not more than one-quarter of an inch in any dimension, and it was nearly circular. In clearing away the bone from about it the sinus wall, which was very thin, was pricked by a spicule of bone, or some little tear

was made in it; at any rate, it bled freely. The sinus felt perfectly fluctuant everywhere; there was nothing about the feel of it to suggest difficulty concerning its lumen. Bleeding from the vein was very easily controlled by pledgets of gauze. It was decided to wait and see what the blood culture would show. In the meantime the boy had another severe chill, lasting twenty minutes or longer, followed by a second. The fluctuations in temperature were somewhere between 99° and 104°. So far as the temperature was concerned, the picture was a typical one of an infected sinus. After eighteen hours the blood culture report proved to be negative. There was still tenderness in the posterior triangle. It was then decided to go in and open the sinus. Another blood culture was made, which also proved to be negative. The sinus was opened, and when this was done there was quite a gush of blood. In other words, the clot found toward the torcular side was parietal. But there was a clot extending well down into the jugular, and this clot had already begun to undergo disintegration. It was not distinctly purulent, but was well disintegrated. Back toward the torcular was a fibrinous clot. In cutting away the bone toward the jugular foramen it was found that the anterior wall of the jugular foramen was so shaped as to divide the foramen into two complete kidney-shaped foramina. A bony growth had developed from the anterior wall, dividing the foramen into two foramina. There was just a little space between the apex of this bony irregularity and the wall, so that it was almost as if there were two jugular veins. It was necessary to chisel away the bone before the clot could be reached. Dr. Libman was present at the operation, and the clots which were removed from the sinus were immediately put into gelatin, and were found to contain streptococci. The child was turned over, and the jugular resected to the level of the omohyoid muscle. The clot extended down not quite to the common facial. Ten days had elapsed since the operation, and the temperature had been practically normal since.

This case was cited in order to emphasize the fact that one is obliged to depend absolutely upon the clinical manifestations now just as much as one was ten years ago. A negative bacteriologic finding signifies nothing. A positive finding, on the other hand, is of the greatest assistance.

DISCUSSION.

DR. GRUENING, in discussing Dr. Whiting's case, said the case bore out what he had maintained. In a series of ten cases which he had published, he had depended entirely upon the clinical manifestations. In three of the cases the blood cultures were negative, but he had proceeded, in spite of the negative findings of the bacteriologists, and had found the thrombus. This merely emphasized that one cannot depend upon negative findings, and that the clinical symptoms are much more reliable than blood cultures. A blood culture which is positive, however, was of material help. Positive blood cultures, in the experience of a number of men at Mt. Sinai Hospital, had cleared up the diagnosis, and in a number of cases a thrombus had been found in the bulb which could not be detected by inspection.

DR. DUEL had had a case quite recently in which, judging from the clinical symptoms, the sinus was involved, and in which a clot about an inch and a half long was removed. The blood culture was negative. The study of bacteremia in cases of ear trouble were still being pursued at the Manhattan Eye and Ear Hospital, and he believed that the whole subject would eventually be modified somewhat regarding the value of the presence of bacteremia in determining the necessity for operation. The undoubted presence of bacteremia would cause one to operate earlier; on the other hand, to have waited in the case cited would have been fatal.

DR. GRUENING called attention to the importance of knowing from which vessel the blood has been taken for the blood culture. If the blood had been taken from the sinus in Dr. Whiting's case, the streptococci might have been found, but at Mt. Sinai Hospital the blood is generally taken from the median vein. The question is not whether the streptococci are in the sinus, but in the circulation.

Sinus Thrombosis; Streptococcus Capsulatus in the Blood.

DR. JOHN E. SHEPPARD, of Brooklyn, cited a case which had been under treatment by another aurist for five or six weeks. When first seen, it seemed to him, judging from the history and symptoms, as if the sinus had been infected about four days previously. Operation was undertaken four hours

later. The man, who was about 60 years old, was profoundly affected by the germs circulating in the system. A very much infected clot was found. The jugular was tied—he did not have time to dissect it out—the patient having become virtually pulseless, in spite of strychnin, saline enemas, etc. He ordered a vaccine to be made from the patient's blood. The germ proved to be the streptococcus capsulatus. Thirty-six hours later some streptococcus capsulatus vaccine was obtained from Hoagland laboratory, and the patient was given a dose, with seeming effect. The man died three days later. Owing to some delay in the hospital service, the autogenous streptococcus capsulatus vaccine was not received until after the patient died. The pathologists claim that it is necessary, at least in streptococcus infection, to employ an autogenous vaccine. In this case, however, even that might not have saved the patient.

DR. GRUENING said it had been demonstrated that in these cases of bacteremia due to otitic disease ligation of the jugular vein is necessary. He had reported several cases in which streptococci had been found in the blood, but the germs disappeared after tying the jugular. From this it would seem to be of more import to tie the jugular than to inject streptococcus serum. Some cases in which streptococci were found recovered, and some in which they were not found did not recover, so he had learned that the pressure of streptococci in the blood did not render the cases of thrombosis of the lateral sinus more fatal.

Hiss Extract.

DR. JAMES G. DWYER, by request, told something of the work with the Hiss extract. This extract was obtained by centrifugalizing the leucocytes of rabbits and extracting in sterile distilled water. By this method the fixative and the cytase, together with the endobodies of the leucocytes, were obtained in a soluble form. Dr. Hiss had reported twenty-four cases of epidemic meningitis and also a series of cases of pneumonia, treated by this extract. The speaker had employed it in seven cases. In one case, following a mastoid operation and jugular resection for acute mastoiditis and sinus thrombosis, the temperature continued to be of a septic character, varying between 103 and 106, for eight days. At this time treatment with the extract was started, and within a few hours

the temperature fell two degrees. Within the next few days it gradually fell to normal, and eventually the patient returned home well. In another case, pansinusitis following the radical Killian operation, the temperature continued to be of a septic type, and for fifteen days fluctuated between subnormal and 105. On the fifteenth day 10 cc. Hiss extract was injected, and following this the temperature fell three degrees within a few hours; after one more injection of the same dose, the temperature became normal and remained so. There were corresponding drops in the pulse rate and the respirations, and the whole general condition was improved. Well-marked symptoms of meningitis were present in this case. The recovery was uneventful.

Dr. Dwyer said that Metchnikoff has shown that the leucocytes give rise to the fixatives and the cytases. These are supposedly extracted in the Hiss extract and are available for immediate action. This extract is thus independent of the organism causing the infection. There are many varieties of streptococci, hence the necessity of using an autogenous vaccine. In Dr. Sheppard's case, following the injection of such a vaccine, the body would be in a state of heightened susceptibility to the infection for some days, the length of time depending on the dose and the reaction of the body. This is the negative phase. It is better, in the speaker's opinion, to use the leucocyte extract in the very acute cases, confining the use of vaccines to the chronic cases or to the locally acute forms.

DR. HARRIS believed serum therapy to be one of the most important questions which had arisen in years. He was glad Dr. Dwyer had taken up the matter and hoped his studies would result in something definite. Conclusions could not be reached from the few cases reported up to the present time, nor could one, at the present state of knowledge upon the subject, hope to depend upon serum therapy to the exclusion of operative procedure. It would be well, however, to reinforce operative measures by such methods as Dr. Dwyer had suggested. The question raised by Dr. Sheppard with reference to the necessity of employing an autogenous serum in order to combat ear troubles is quite apart from the subject under discussion. The leucocyte extract was quite different from the

antistreptococcic serum. Dr. Dwyer was asked to explain this matter.

DR. FRANCIS J. QUINLAN cited a case which had been under his care at St. Vincent's Hospital. The patient, a man, had had a discharge from the ear for seven or eight days, which, by aural inspection, had apparently healed. There was some tenderness over the emissary vein, sweats which soaked the mattress, and a septic temperature which fluctuated between 100 and 103 degrees. The body of the mastoid presented no symptoms of interest. An exploratory operation was advised and consent obtained after some delay. Before the patient had been taken to the operating room Dr. H. Biggs, who saw him in the ward and agreed that he was profoundly septic, asked the speaker if he had tried antistreptococcic serum. Upon this suggestion some of the serum was immediately obtained and injections given every day at first, then every other day. The temperature became normal, the sweats subsided, and the mental condition of the patient improved. The tenderness, however, persisted. A week had elapsed since the injections were begun, and there had been a complete transformation in the condition of the patient. The question presented itself as to how far the serum is potential without operative interference, and whether any serious infection in the vein would be eliminated by the antitoxic serum.

ABSTRACTS FROM CURRENT OTOLOGIC, RHINO- LOGIC AND LARYNGOLOGIC LITERATURE.

I.—EAR.

The Meaning and Treatment of Diseases of the Eustachian Tube in Connection With Inflammation of the Middle Ear.

URBANTSCHITSCH, Wien (*Wien. med. Wochenschrift*, 1910, No. 2). Salpingitis chronica purulenta is quite commonly observed in combination with otitis media purulenta chronica. It can cause an otitis on the one hand or a tonsillitis on the other. By means of a catheter he washes out the tube, first with normal salt solution, and then by means of bougies covered with a 7-10 per cent solution of nitrate of silver he cauterizes the interior of the tube.

Contraindications to the Tympanomastoid Exenteration in Chronic Suppurative Otitis Media.

E. A. CROCKETT, Boston (*Journal of A. M. A.*, July 31, 1909). Except in the presence of meningitis or septicemia symptoms the radical mastoid is contraindicated in nearly all patients with double middle ear suppuration or with unilateral suppuration, and the hearing destroyed in the other ear. In an adult who has carried a suppurative ear for forty or fifty years operation is not advised until faithful middle ear treatment has been carried out for at least six months. The radical mastoid operation should practically never be done in children under five years of age.

It is contraindicated in all cases unless the operator is experienced in the surgery and anatomy of the temporal bone. There is always a chance of stopping the discharge and ultimately improving the hearing by ordinary tympanic treatment. In children this is especially true. Up to the age of five, local treatment failing, a simple operation is indicated, draining the middle ear through the antrum. Ryder.

Mastoiditis in Scarlet Fever and Measles.

HENRY A. ALDERTON, Brooklyn (*Long Island Medical Journal*, December, 1909). From July 15, 1907, to July 15, 1909, the writer had under observation 1621 cases of scarlet fever

and 2106 cases of measles. In the scarlet fever series, 178 cases (practically 11%) developed suppurative inflammation of the middle ear. Many of these developed mastoid symptoms, 47 (26%) requiring operation. Mortality, 25%. Among the measles 326 cases developed ear trouble (15%), 34 cases (10½%) requiring mastoid operations, with a mortality of 29%.

The mortality in the operated cases cannot be attributed wholly to the mastoid disease, but rather to the fact that in the great majority of the fatal cases other and serious complications existed—bronchopneumonia, nephritis, endocarditis, enteritis, etc.

The symptoms of otitis follow about the same type in the two conditions, with the difference that in measles they are apt to be less of the fulminating type, and there is not so much destruction of the middle and internal ear and of the neighboring parts.

As regards prognosis the complication of bronchopneumonia is especially unfortunate. In the 22 fatal cases in the two series bronchopneumonia occurred 14 times. The higher mortality in the operated cases in the measles series is accounted for by the greater prevalence of the inflammatory conditions of the respiratory tract.

Ryder.

The Physiology of the Eustachian Tube.

EDMUND PRINCE FOWLER, New York City (*Journal of A. M. A.*, July 31, 1909). Following a number of observations Dr. Fowler concludes that the act of swallowing increases the sound of tuning forks heard either by air or bone conduction.

If a tuning fork is vibrating strongly near or below the nostrils a marked increase in the intensity of its tone will be perceived in both ears during the act of swallowing. This increase lasts during the first part of deglutition, that is, while the tubes are open.

If the fork is held before the nostrils and the patient swallows at the instant when its note ceases to be heard, the sound will again become audible to him. This increase in sound perception is due almost wholly to the opening of the eustachian tube during deglutition.

If a vibrating tuning fork is placed in firm contact with the scalp, preferably over the lambda, a marked increase of the

sound will be noted by the patient during deglutition or tubal opening.

The increase in the sound of vertex forks during tubal opening is brought about by two factors: the opening of the communication between the middle ear and nasopharynx, thereby permitting increased perception by air conduction, and increased bone conduction due mainly to slight changes in the drum membrane.

Dr. Fowler has devised an automatic ear inflator for home use. He illustrates the same and describes the method of its use.
Ryder.

Clinical and Anatomic Manifestations of Otitic Brain Abscess.

ALFRED WIENER, New York (*Medical Record*, January 23, 1909), emphasizes the following points: If suppuration is still going on in the middle ear or contiguous parts and the diagnosis of complicating abscess is reasonably sure, it is well to bear in mind that in fifty-seven per cent of these cases the brain abscess and the suppurating ear are in direct communication. The remaining forty-three per cent of the cases are classified as metastatic abscesses, subsequent to the ear condition, but with no direct connection between the primary suppurative condition and the abscess. In about twenty-six per cent of the cases the suppurative process in the ear is still active.

Brain abscesses are at times latent and possess very thin walls. They may be situated dangerously near the ventricles or arachnoid space. In such cases, if the mastoid process is first attacked the necessary chiseling may lead to rupture of the abscess with rapidly fatal results. Latent abscesses may exist for a long time and become manifest after an ordinary trauma of the skull.

In the treatment of otitic brain abscess we should especially consider first its location; second, its duration, and third, its intimate connection with the existing suppurative process in the middle ear cavity.
Ryder.

Symptoms of Intracranial Complications of Purulent Otitis.

ARTHUR B. DUEL, New York (*Journal of A. M. A.*, July 31, 1909). Cranial involvement from acute purulent otitis is likely to be rapid, acute, accompanied by violent systemic dis-

turbance with localized symptoms; from chronic purulent otitis slow, distinctly localized, with slight systemic disturbance.

The lesions considered are inflammation of the meninges, inflammation of the brain, inflammation of the sinuses of the dura, and erosion of the internal carotid artery.

The symptoms arising from meningeal inflammation and those from collections of pus within the cranium are best appreciated from three points of view: systemic, due to toxemia; mechanical, resulting from cranial distension; and those resulting from pressure on a distinct or definite area of the brain.

Meningeal inflammation has three characteristic symptoms—headache, vomiting, and constipation. Following purulent otitis or mastoiditis these symptoms, with fever, and one or many of the indications of cortical irritation point unmistakably to meningitis. Lumbar puncture will throw much light on the nature of the infection.

Symptoms of pressure, headache, slow pulse, optic neuritis, change of size of the pupils, somnolence, while indicative of intracranial lesion, are not characteristic of any particular type or location. Localizing symptoms, when present, are frequently most definite in pointing to the position of an abscess.

A typical infective thrombosis of the sigmoid sinus gives a characteristic picture: chilly sensations or rigor, rapid rise of temperature (104 to 106), succeeded by as rapid a fall to normal and sometimes subnormal, sweating, all repeated possibly in a few hours or more. Mind clear.

Erosion of the internal carotid artery is extremely rare. The diagnosis is evident from the gush of bright red blood from the auricle.

Ryder.

New Method of Tuning Fork Testing.

BARANY (*Wien. klin. Wochenschrift*, No. 41, 1909). In carrying out the tests of Rinne and Schwabach the errors are as follows: 1. The amount of pressure made with the handle of the fork can cause an apparent difference in the length of the bone conduction. 2. The conduction is different at various points on the mastoid process. 3. The thickness of the overlying tissue causes differences in the time of the conduction. 4. The extraneous sounds in the room are an important

factor in the test. These disadvantages he has entirely eliminated by the following method: On the three ends of a T-shaped brass tube pieces of rubber tubing of the following lengths are fastened: For the ear of the physician a piece 66 cm. long, to the ear of the patient a piece 22 cm. long, and on the vertical branch a piece 88 cm. long is fastened. The ear of the patient is connected with the ear of the physician, and by means of the vertical piece the olive-shaped plugs in the ears are proved air tight by blowing through them. When they fit tightly the greatest amount of hindrance to the transmission of air waves possible is secured. If the fork is placed on the mastoid tip of the patient, and after he has ceased to hear the tone it is still heard by the physician, then there is a disease of the internal ear. The determination of deafness, due to transmission of the waves by the ossicles, is made by comparing the transmission of sound by means of the cartilage of the external ear and the bone conduction of the mastoid tip. A normal person is taken for the trial. The handle of the vibrating fork is pressed hard against the cartilage of the ear, and then lightly against the mastoid bone. The transmission of sound from the cartilage is much greater than the transmission of sound from the bone. The opposite conditions take place when the greatest pressure is made on the bone. By a little practice the same tone can be obtained from the cartilage as from the bone. When this test is carried out with low and middle toned forks, and the patient and physician hear the sounds alike, then there is no middle ear deafness. If, however, there is a middle ear deafness present, the conditions are entirely different. The physician notes no difference in the length of the two tones, but the patient notes a distinct shortening of the cartilage transmission, but not of the bone transmission. Even when the physician hears the tone louder from the cartilage than from the bone the patient hears the opposite condition. There seems to be no doubt that Barany has made an important discovery in this new test, but one must study the original paper carefully to understand how free from criticism the new test is.

Horn.

A Specimen of an Encapsulated Brain Abscess.

H. P. MOSHER (*Boston Medical and Surgical Journal*, July 15, 1909). The patient, a man about 40 years old, was brought

into the Massachusetts Charitable Eye and Ear Infirmary unconscious. He presented the text book picture of brain abscess, unconsciousness, slow pulse and a beginning optic neuritis. There was no paralysis. Some three months before he had been operated upon for an acute mastoid. The operative wound had filled in, except for a small fistula. The usual operation was performed—that is, the antrum and adjacent territory of the mastoid were laid freely open. No fistula was found leading from the roof of the antrum to the cranial cavity. An opening was then made through the side of the temporal bone above the antrum. The dura was bulging and pulseless, and cutting through it the knife entered a cavity containing about an ounce of pus.

The cavity was found to run inward and forward for about two inches. It was drained, partly by rubber tubes and partly by gauze wicks. The next morning the patient was rational and better, but in the evening he was unconscious again and in bad condition. On the second morning the author redressed the abscess cavity and explored it with the finger. In the upper anterior part of the wound there was a bulging mass of brain tissue. In order to clean up the wound and make drainage better some of this was cut off and the top of an encapsulated abscess removed. The abscess sac was easily enucleated with the finger. An autopsy was obtained, and it was found that both abscesses were in the typical place, the acute abscess above the roof of the mastoid antrum, and the encapsulated abscess above the roof of the middle ear.

Neither abscess had a stalk, upon the finding of which Ballance lays so much stress. There was no fistula in the bone over the antrum, neither was there one in the bone over the middle ear, but the bone here was red and somewhat necrotic. This corresponds with the well-known fact that in at least one-half of the cases of brain abscess due to infection from the ear no bone fistula is found.

The encapsulated abscess was about the size of a hen's egg. It was found empty, with walls a quarter of an inch thick. The inner layer of the abscess walls consists of granulation tissue, next to this a layer of fibrous tissue and next to this, where the abscess came to the surface of the brain, the hemorrhagic and edematous pia with its many vessels could be seen.

Theisen.

A Case of Meniere's Disease Dependent on Inflammation of a Nasal Sinus.

PROF. H. BURGER (*Tydschr. v. Gen.*, February 8, 1908) mentions Ten Siethoff's description in 1898 of a series of cases of Menière's disease, where treatment of different nasal conditions removed the symptoms of this disease. At the Congress of Natural Sciences and Medicine in Leiden (1907), Ten Siethoff in an extensive report gave his endonasal treatment. He considers the large majority of Menière's diseases as reflex neuroses, originating in the diseased nasal mucous membrane. The attacks he explains as due to abnormal contacts in the nose. Burger does not think that this can be accepted generally. He found in a number of cases, on careful examination, a normal nose. Moreover a well-defined physiologic reflex as base for the reflex neurosis is absent in Ten Siethoff's theory. As he did not describe his cases extensively, nor give the results of the functional examination, the critic must for the present suspend judgment. But the inexplicability of these cases gives no right for ignoring them. Others have seen similar recoveries. Burger observed the following case in the spring of 1906: A 31-year-old woman suffered for a year with dizzy spells combined with nausea, noise in the left ear and a subjective sensation of turning around her body axis. These spells were very frequent, with danger of falling if she did not hold fast. Her head is kept fixed, as every turn to the left produced dizziness. Six years ago, after a delivery, she suddenly became deaf in the left ear, beginning with pain and dizziness. A year ago both drums were opaque, without reflex, not retracted. Watch: right at 55 cm., left 0. Whisper voice: right extent of room, left 30 cm. Rinne: right +, left —. Schwabach: right and left somewhat shortened. Weber: lateralization toward left. Upper limit Galton: right 0, 4; left 2, 5 (normal 0, 2). Lower limit: right 14 vibrations, left 100. Tuning fork (Quix) g^4 ; right 15 sec. (= norm.), left 9 sec. With the goniometer a considerable diminution of the static equilibrium: inclination ant. 8° , post. 6° , lat. dext. 9° , lat. sin. 9° . She totters with eyes closed.

Diagnosis: Affection of the left middle ear and labyrinth. Superficial examination shows the nose normal; however, the anterior part of the middle concha shows polypoid enlargement, after lifting of which a pus line is seen in the middle

nasal canal. With an electric mouthlamp the right cheek and pupil are distinctly illuminated, while at the left all remains dark and patient has a subjective light sensation in the right eye alone. Patient has not a single nasal complaint; she remembers, after questioning, that for years she draws much secretion from the nose into the nasopharynx. And she has for some indefinite time a disagreeable smelling sensation on the left side. With roentgenoscopy in frontal direction and in three-fourths profile no difference between right and left, but positive difference a week later, at the expense of the left maxilla. She has suffered much with toothache, and her teeth are in deplorable condition. Under local anesthesia the antrum was opened in the fossa canina; it was filled with thick pus, and the mucous membrane was much swollen. The wall between antrum and nose was removed for a large part, and the mucous wound in the mouth sutured. All diseased roots were extracted. Two days after removal of the iodoform gauze from the nose she felt much better; headache gone, also the dizziness and noise in the ear. When patient went home the discharge had greatly lessened, and the kakosmia disappeared. The recovery was complete except for deafness on the left. No more dizziness and she can move her head freely in all directions. The secretion from throat and nose had entirely stopped. The last functional examination was about four months after operation: Watch: right 90 cm., left +0. Whisper voice: Right extent of room, left 12cm. Rinne: right +, left —. Schwabach: Right somewhat shortened, left not shortened. Weber: lateralization toward left. Goniometer: inclinatio lateralis, right 20°, left 22°; inclin. post. 21°. She walks well with eyes closed.

Burger wishes to drop the name Menière's disease entirely, or to use it for all cases where dizziness is present in spells with the character of aural vertigo, combined with nausea or vomiting, noises in the ear and diminution of aural acuity, the last of which remain in the intermissions. Aural vertigo is characterized by subjective sensations of turning and the appearance of head movement, especially on motion in one distinct direction.

Burger excludes the possibility that suggestion may have helped in the recovery, as no mention was made of a possible connection between nasal suppuration and dizziness. If a reflex-influence must be accepted, Burger considers vaso-

motor influences dependent on the pus formation. Francois Franck says that irritation of the sensitive nerves of the nasal mucous membrane produces dilatation of the vessels in all organs of the head.

Blaauw.

II.—NOSE.

The Traumatic Etiology of Abscess of the Septum.

ANDEREYA, Hamburg (*Deutsch. med. Wochenschrift*, No. 4, 1910) reviews literature and concludes from study of his four cases that abscesses of the nasal septum are usually traumatic in origin, even though no history of the trauma can be elicited. He advises trial of replacement of fragments, but if this is impossible then a submucous resection is indicated.

Horn.

Some Complications and Dangers of Nasal Surgery.

TAWSE (*Lancet*, November 27, 1909). According to this writer, the frontal sinus operation as now carried out is the bugbear of modern rhinologic surgery and should only be approached with fear and trembling. He is satisfied when the patient is in the following condition: "In cases where pus escapes freely from the frontal sinus, and is producing no ill effects on the general health and only occasional headaches are complained of, I think the risk of the operation more than counterbalance its advantages. In considering the possibility of an operation, one must consider if the patient's confidence will stand the strain of perhaps a tedious and painful course of treatment, and one must be ready to banish all gloomy thoughts, to combat every evidence of flagging courage, and to make the patient feel that both are successfully striving to produce an early and favorable termination of the trouble. * * * * Women suffer from painful and irregular menstruation and discover some tender spot in the ovarian region and hurry to the gynecologist." These are certainly objections to the operation and the after-treatment, and make one wonder if it were not better that we call in a Christian Scientist in all of our Killian operations as an aid to the after-treatment.

Horn.

The Correction of Depressed and Irregular Deformities of the Nose by Mechanical Replacement.

WILLIAM WESLEY CARTER, New York (*Journal A. M. A.*, December 4, 1909). Dr. Carter has devised an apparatus for

the purpose of bringing into proper position the separate parts of a depressed nasal arch and holding them until union has occurred. This appliance, called a combined bridge and intra-nasal splint, exerts its force in accordance with the mechanical principles involved in the formation of the bridge of the nose—i. e., the arch.

It is applicable to three classes of nasal deformities, viz.: congenital, those due to disease, and traumatic. The extent to which the first two classes may be benefited depends upon the amount of healthy bony framework available for reconstructive purposes. Under traumatic deformities recent fractures present the ideal conditions for the use of the combined bridge and splint. In old traumatic deformities it is necessary to mobilize thoroughly all the tissues, and if there has been a loss of tissue it may be necessary to utilize a portion of the nasal processes of the superior maxillæ before applying the splint.

Dr. Carter reports a number of cases treated by his method and shows cuts of the splint illustrating its mechanical principle and method of applying.

Ryder.

The Submucous Resection of the Nasal Septum—A Raspatory for the Avoidance of Perforations.

OTTO T. FREER, Chicago (*Journal of A. M. A.*, December 4, 1909). Dr. Freer finds that in the course of submucous resections perforations most often occur in baring the so-called ridge of its periosteal covering. The term "ridge" is used to describe the bony base of the septal skeleton and is composed of the incisor crest, the anterior end of the vomer and the superior maxillary crest. The periosteal covering of the ridge is distinct from the perichondrial envelope of the septum. The perforation is made along the top of this ridge, where the perichondrium and periosteum on one side are continuous with these membranes on the other side of the septum. The operator, after removing the cartilaginous deflection, tears or cuts his way into the other nostril in attempting to elevate the periosteum. The mucous membrane seems to tear very readily in this region, and a mere slit at first becomes a large hole when the ridge is resected.

Dr. Freer has devised a raspatory for the denudation of this ridge, which in his hands has proved successful. A cut is shown of the instrument and the technic of its use is described.

Ryder.

The Early Forms of Ozena.

E. BAUMGARTEN (*Archiv. für Laryngologie und Rhinologie*, Bd. 23, Heft 3, 1909) has found beginning ozena in children between 4½ and 5 years old. A stage of hypertrophy of the mucous membrane preceding the atrophic process has been frequently described, but, according to the author's investigations, this is not a true hypertrophy, but merely an intumescence of the inferior turbinate. This swelling gradually disappears until finally the picture of a genuine ozena is present.

The condition the author usually found in beginning ozena was an atrophy of the inferior turbinate of one side, with dried secretion of a grayish-brown color in the posterior part of the inferior meatus. In this stage the first symptom is apt to be a bad odor from the nose. In the other nostril there is usually a swelling of the inferior turbinate, which seems to be greater in young children. This one-sided contraction of the inferior turbinate the author regards as characteristic of a beginning ozena, and this is frequently followed in a few days by a fullness of the turbinate. After from 2 to 4 years both turbinates are contracted and then, as a rule, the crust formation and characteristic odor develop. The posterior part of the inferior meatus particularly becomes very wide, and the crusts and thick secretion appear first in this part of the nose. Ozena may develop shortly after the birth of the child, and children with eczema of the nasal vestibule should receive particular attention in this respect.

The author believes that if children do not develop ozena by the tenth year they will not get it at all. It rarely develops after the tenth year.

Girls develop ozena much more often than boys, and the writer is of the opinion that it is transmitted by the mother. He has records of a number of cases in which mothers with ozena had two or three daughters with the same disease, while the boys in the family were healthy. Lues does not play an important role in ozena. A good many cases of lues tarda in older children have been observed during a period of years, and ozena did not develop in any case. He has not observed that ozena develops more frequently in the children of syphilitic parents than in the children of healthy parents.

Not much weight should be attached to any of the many theories as to the origin of ozena. The author believes that

the most rational theory to explain the development of ozena is that a trophic disturbance of probably central origin results in a secretory anomaly in the nose, which in turn causes a lessening and drying of the secretion with crust formation. This producing pressure against the mucous membrane, causes circulatory disturbances, which result in the atrophy of certain parts of the nose.

Theisen.

III.—PHARYNX.

Gangrene of a Foot and a Lower Leg in a Child Consecutive to an Angina.

H. A. LAAN (*Tydschr. v. Gen.*, January 25, 1908) reports the following case: A 7-year-old boy was healthy until March, 1905. He then complained of a sore throat, swallowing with difficulty, and had painful glands in the neck. Cod liver oil was given, and a Priessnitz bandage around the neck. The local symptoms had disappeared 14 days later, but edema of the face, hands and legs existed. The following day the legs were blue and ice-cold, while the swelling of face and hands disappeared after a few days. The physician then was called in. He found only some redness of the throat. At the same time an abscess in the gluteal region existed, which required much time for healing. About the middle of May demarcation at the legs was present. This process was left to nature and was finished in September, 1906. Oppression and heart palpitation accompanied the beginning gangrene, while the urine at that time was very dark, nearly black. Only in the beginning of January, 1907, could the parents be persuaded to do something for the child. It was then that Laan saw him. Laan performed some plastic operations, and with the help of some apparatus made him walk again.

Only four cases more are found in the literature of gangrene of the limbs in young persons consecutive to throat infections.

Blaauw.

Diphtheria Following Tonsillotomy.

LEVINSTEIN (*Archiv. für Laryngologie und Rhinologie*, Bd. 22, Heft 2, 1909) reports the following case: A child aged 7 years was brought to Prof. Fränkel's nose and throat clinic for an operation for tonsils and adenoids. On examination this condition was found and an operation advised. With the ex-

ception of the large tonsils, which were not inflamed, and the adenoid growth; nothing abnormal was found in the nose and throat.

The mucous membrane was normal in appearance. The operation was performed and the child was sent home, with the request that the parents bring her to the clinic again in a week. When the child was brought back the parents reported that she had not been well, had had fever right along, and had been breathing with difficulty.

On examination of the throat, both tonsil wounds were covered with a thick yellowish-white membrane. The dyspnea, croupy cough, and difficult breathing showed that the larynx was also involved.

The child was sent to the contagious ward of the Charité and was at first intubated, but as the tube was repeatedly coughed out, a tracheotomy was performed. Large doses of antitoxin were administered. A bacteriologic diagnosis of diphtheria was made.

Caille has reported two similar cases of diphtheria following the removal of tonsils. In Caille's cases the throats were also perfectly normal in appearance before operation.

The writer believes that these three children either had Klebs-Loeffler bacilli in their throats before operation, or some person who had charge of them was the carrier of the infection. The presence of virulent diphtheria bacilli in the mouths of healthy persons has frequently been demonstrated. H. W. Gross, out of 314 persons examined by him, found the bacilli in the throat or nose in 79 per cent.

Aaser found during an epidemic of diphtheria in a military barracks that 19 per cent of apparently healthy soldiers had virulent bacilli in their throats. Only a small percentage of them finally came down with diphtheria.

Geirsvold examined 967 healthy school children in a Christiania school shortly after a diphtheria epidemic, and found diphtheria bacilli in the throats of 9.2 per cent.

Statistics show that the bacilli are frequently found in the throats of healthy persons who had either had diphtheria some time before or had come in contact with it, and they may remain virulent for months. Such persons are the most dangerous carriers of the infection.

According to the literature of the subject, from 8 to 10 per

cent of persons coming in contact with diphtheria cases are carriers of virulent diphtheria bacilli, so that taking cultures from children's throats before every tonsil and adenoid operation might save them from autoinfection, but not from the danger of infection of the wound through persons looking after them.

Theisen.

A Surgical Method for the Control of Hemorrhage After the Removal of Tonsils.

COHEN (*Archiv. für Laryngologie und Rhinologie*, Bd. 22, Heft 3, 1909). Welty, Stucky, Richards and others claim that the loss of blood is less when the radical tonsil operation, that is, when the tonsils are dissected out, is performed, than when the tonsillotome is used, while Jackson, Thomas and Vaughan believe that it is greater.

It is worthy of note that in 34 of 54 cases of severe hemorrhage during the removal of tonsils collected by Smith and Wright, the tonsillotome was employed.

In three of six fatal cases of hemorrhage recorded in the literature between the years 1868 and 1904, the tonsillotome was employed. In the three other cases the method of operating was not stated.

In four other fatal cases of hemorrhage occurring recently the tonsillotome was also used.

In the author's experience the hemorrhage is greater with resection of the tonsils than when they are simply amputated, because in dissecting out the tonsils the vessels in the vicinity of the large arteries are cut.

Two cases of severe hemorrhage are reported. In the first, a young woman, aged 23 years, the tonsils which were very large, were removed in the writer's office with knife and forceps under local anesthesia. The hemorrhage during the operation was severe, and on one side was controlled with Monsell's solution. The patient was sent to a hospital with a hemostat in place on the other side. This was removed the same night, and the tampon three days afterwards, without any more bleeding. A secondary hemorrhage occurred on the right side on the ninth day, which was controlled with ice. On the next day another hemorrhage necessitated the application of the hemostat. When this was removed later on the same day a severe hemorrhage occurred, and it had to be applied again.

On the next day, twelve days after the operation, another severe hemorrhage occurred, and patient was in an extremely serious condition. She was then placed on the operating table, and a gauze tampon corresponding in size to the tonsil that had been removed, was pressed into the tonsillar fossa and held in place. A continuous suture was then carried through the faucial pillars. This was removed in four days, and the tampon on the fifth day. There was no further bleeding after this.

In the second case the tonsils were removed under local anesthesia from a man 36 years old.

The tonsils were dissected out with the capsules. No primary bleeding occurred, but on the evening of the same day, after coughing, a violent hemorrhage came on. The bleeding came from both tonsillar fossæ, but more from the right, and a spurting vessel could be seen deep in the right fossa near the base of the anterior pillar. A ligature was applied, and two other bleeding vessels were also ligatured, after which the bleeding stopped and did not return.

In considering the question of hemorrhage after tonsil operations, the author quotes the cases, 150 in number, collected by Damianos and Hermann. Of these, only five occurred in hemophilics. Of the eight fatal cases, it could only be determined that two were bleeders.

The wounding of the pillars is given as a frequent cause for hemorrhage, and many operators believe it is the usual cause with the newer method of operating. There is always more hemorrhage when muscle fibers are exposed. *Theisen.*

IV.—LARYNX.

The Value of Bronchoscopy in Internal Medicine.

EPHRIAM (*Berlin. klin. Wochenschrift*, No. 43-44, 1909). In a long and very interesting article Ephriam reviews in full the uses to which bronchoscopy has been put in internal medicine. The differences in the color of the bronchial mucous membrane, which until very recently we knew nothing about, has largely entered into the differential diagnosis of certain inflammatory conditions of the lungs. The diagnosis of various forms of stenosis of the bronchi have been made possible, and the local treatment has been carried out in a number of cases. Syphilis of the upper air passages has until only re-

cently been very little studied, from the clinical standpoint. We are now able to diagnose syphilitic stenoses and carry out a rational treatment. Much has also been learned about the presence of bronchial glands, and many obscure points cleared up.

In severe attacks of hemoptysis we may be able to clear up a diagnosis, and it has even been suggested that in severe cases we may tampon off one side of the lung or at least keep the other side from filling up with blood. *Horn.*

Stenosis of the Larynx Cured by Intubation.

EMIL MAYER, New York (*Medical Record*, December 25, 1909), reports three cases of laryngeal stenosis successfully treated by intubation following a gradual dilatation with the Schrötter tubes. The cases were all extreme, requiring tracheotomy, and were of unusual origin; one following a gunshot wound, the second a posttyphoid perichondritis, and the third a recurrent granuloma. One case, the gunshot wound, refused treatment after a certain amount of improvement. Case number two, the posttyphoid perichondritis, wore an intubation tube for five months, and at the present time (five years after removal of the tube) has only a slight hoarseness and no difficulty whatever in breathing. In the third case the intubation tube was kept in position for four weeks. One and one-half years have now elapsed since removal of tube, and there has been no return of any dyspnea. *Ryder.*

Amputation of the Epiglottis in Laryngeal Tuberculosis.

WOLFF FREUDENTHAL, New York (*International Journal of Surgery*, November, 1909), gives three indications for total removal of the epiglottis; first, dyspnea, caused solely by excessive growth of the epiglottis; second, a rapidly breaking down epiglottis, and third, dysphagia, which cannot be overcome by medical treatment. Laryngeal dyspnea due to an enlarged epiglottis occurs very rarely. The epiglottic lesion is usually coincident with other obstruction farther down—perichondritis of the arytenoids, infiltration of the vocal cords, etc. In such cases the only relief is tracheotomy.

In the second class of cases wide experience and good judgment only can tell what is best to be done. After extirpation

the process may rapidly spread, or again, local treatment may be sufficient.

The third indication is the most frequent. Here it is necessary to differentiate between ulcers on the top of a generally flattened epiglottis—that is, on its lingual side—and such ulcers as are hidden from view and cannot be reached by local treatment. Pronounced dysphagia with no visible ulcers is the diagnostic point. Such a condition cannot be treated locally.

Dr. Freudenthal has operated on fifty cases.

Ryder.

Clinical Contributions to Esophagoscopy and Tracheobronchoscopy.

OTTO KÄHLER (*Wiener med. Wochenschrift*, Nos. 47, 48, 49, 1909). The technic of examination with the esophagoscope in cases of diverticulum is often made very difficult by the accumulation of enormous masses of food, and in many cases it is not possible to get a clear view during the first examination.

The patient should always be in the recumbent position, because in any other position the field of vision can not be properly cleaned.

Cases of diverticulum of the esophagus can be so readily diagnosed by an X-ray examination that the use of the esophagoscope may be dispensed with in such cases. The diagnosis can, however, be also easily made by means of esophagoscopy.

It is easy to get into the sac, but difficult to find the outlet of the diverticulum.

Cases of Zenker's diverticulum were most frequently examined.

Killian has described their positions very accurately, and he has been able in all his cases to see the esophagus as well as the sac. He found that they were located over the mouth of the esophagus, so that they must be regarded as pharynx diverticuli. This location explains the mechanical theory of such dilatations; esophagus spasm must be regarded as the cause.

The value of esophagoscopy in differential diagnosis was shown in two cases referred to the writer, with a probable diagnosis of carcinoma, and in which he was able to determine the presence of inflammatory ulcers.

Miss H. O., aged 19 years, was seen in April, 1909. Difficulty in swallowing for two months, with pain and retention of food. During the second examination with the esophago-

scope, made under cocain, two small ulcers could be seen about 20 cm. from the teeth. After eight days' treatment the esophagus appeared perfectly normal, so that the ulceration must be regarded as simply of a catarrhal nature.

The second case, that of a man aged 45 years, was similar, and was cured in a short time with silver nitrate and proper diet.

Catarrhal ulcers of the esophagus are uncommon, but have also been described by Gottstein and Rosenheim. The symptoms in the beginning are hard to differentiate from carcinoma, and the diagnosis can only be cleared up with the help of the esophagoscope.

The author also describes one case of syphilis of the esophagus and speaks of the importance of an early diagnosis in order to prevent the cicatricial stenosis which would surely follow a failure in making a correct diagnosis.

Primary esophagus spasm is of common occurrence and usually takes the form of a cardiospasm. Mikulicz was the first to describe the characteristic picture of this condition.

Spastic stenoses without some anatomic basis are rare in the upper parts of the esophagus. The picture of a cardiospasm as well as that of a spasm of the esophageal entrance is hardly different from that of a normal closure. In all cases of cardiospasm a distinct widening of the esophagus could be seen.

Four cases of idiopathic dilatation of the esophagus are reported in the author's article.

One case (from the same clinic) was reported by Glas, which pointed to the probable truth of Kraus' theory. In this case, in which a dilatation of the esophagus was present, a compression of the vagus by a mediastinal tumor could be determined.

In considering tracheobronchoscopy the author states that direct laryngoscopy should not replace the indirect method of making laryngeal examinations.

The ordinary laryngeal operations, such as the removal of polypi, papillomata, curettage of tuberculous infiltrations, etc., can be performed in the old way with much greater comfort to the patient.

Direct laryngoscopy is of great value in children, and five cases in which papillomata were removed in this way in children, under general anesthesia, are reported.

Direct tracheobronchoscopy gas proved of the greatest value in the removal of aspirated foreign bodies from the trachea and bronchi.

Killian in 1897 was the first to remove a foreign body from the air passages in this way, and since that time a large number of cases have been reported by Jackson, Neumayer, Schrotter, Schneider and others. V. Ecken has collected over 400 cases from the literature.

In the author's clinic sixteen foreign bodies were removed from the trachea and bronchi, the youngest patient being a child of 6½ months.

He has been able to collect seven cases of bronchoscopy for foreign bodies in children under one year.

In six of the author's cases the foreign body lodged in the trachea, in nine in the right bronchus and in one in the left.

Foreign bodies are aspirated into the right bronchus much more frequently than into the left. Of 125 cases collected by Gottstein, 77 were in the right and 25 in the left bronchus.

Theisen.

V.—MISCELLANEOUS.

The Value of the Wasserman Reaction in Rhinology.

WEINSTIEN, New York (*Deutsch. med. Wochenschrift*, No. 39, 1909), finds this reaction of great value in doubtful cases. A positive reaction is certain proof of the presence of syphilis, while a negative reaction gives a 90 per cent possibility that the disease is absent.

Horn.

My Experience With Fifty-three Operations for Cleft Palate.

HELBING, Berlin (*Berlin. klin. Wochenschrift*, No. 39, 1909), has had a great experience in cleft palate operation. The reviewer was present when he read the above paper, which was received with a good deal of respect. An assistant of Brophy, of Chicago, quietly arose in the discussion and reported nearly 2000 cases. It was quite a surprise to the Germans present. Helbing takes the standpoint that the modern operation for cleft palate is an invariable substitute for all prosthetic appliances, and that cases as young as four months can be operated without danger. He has never lost a patient. He describes a few modifications in the technic of the operation.

Horn.

Anomalies of the Mucous Membrane of the Mouth in the Young-Born as a Sign of Degeneration.

CORNELIA DE LANGE (*Tydschr. v. Gen.*, November 16, 1907) observed some years ago the gingiva in a four-weeks-old child covered with numerous small irregularities, knobs and small lumps, anteriorly and posteriorly, as well as at the free margins. The mucous membrane had the same color at the point of the irregularity as at the smooth parts. Later it was found that the child suffered from myotonia congenita (Oppenheim); the child had hernia umbilicalis and hernia scrotalis. There was no lues present. After appearance of the first dentition the abnormality of the gingiva was less distinct. After seeing this case she found oftener the condition in the newly born, constantly with other degenerative signs. They had all an abnormally strongly arched palate; in many the auricular concha was abnormal. One had a small auricular fistula on the helix, another a small fibroma directly before the tragus, etc.

In a patient with pedes vari congeniti and other defects, most probably due to amniotic strings, the gingiva showed two small elevations at the place where later the lower inner incisivi come. An ogival palate was also present.

She noticed twice at both sides, where later the milk molars appear, a symmetrical protrusion of the mucous membrane of the jaw, in the first case 1 cm. long, $\frac{1}{2}$ cm. high and thick; in the second case somewhat smaller. In both children this excrescence was only just indicated on the upper jaw; the first child has a gothic palate and an asymmetric skull and face, the second had an abnormally arched palate and an umbilical hernia.

Blaauw.

Further Observations on Bismuth and Other Paste Treatments in Suppurative Diseases of the Nose and Ear.

JOSEPH C. BECK (*Ohio State Medical Journal*, September, 1909) states that he has been guided in using the bismuth paste in the treatment of suppurative diseases of the nose, ear and throat by the results that the general surgeons have obtained in suppurative diseases of other cavities of the body, as suppurative diseases of the joints, etc. The author has also used the bismuth paste as a dressing after the acute mastoid operation with drainage. He states that the reason the same success that the general surgeons have had has not been obtained with this method of treatment is because the accessory

nasal cavities are noncollapsible cavities, lined with mucous membrane.

The following four formulæ have been employed: Paste 1.—Bismuth subnitrate 33, vaseline 67. Paste 2.—Bismuth subnitrate 30, vaseline 60, white wax 5, paraffin (melting at 120°) 5. Paste 3.—Bismuth subnitrate 30, vaseline 50, paraffin 10, white wax 10. Paste 4.—Bismuth subnitrate 30, vaseline 35, paraffin 25, white wax 10.

Formula No. 1 is practically the only one used in suppurative conditions of the ear and accessory nasal cavities. No. 2 is used as a mastoid dressing after the radical operation, and Nos. 3 and 4 are used in place of the Moorhoff plug.

Slides were shown showing the anteroposterior and lateral radiograms of injected antra of Highmore, frontal sinuses, sphenoidal sinuses, the ethmoidal region, external and middle ears and the mastoid process after operation. The slides showed positive proof of the cavities being injected.

Several slides were shown of injected chest cavities for the cure of empyemata. This was to demonstrate the absorption of the bismuth paste. One series of three showed where the patient received an injection of 600 grains of paste No. 1, and it became absorbed in a little over two months' time, with a cure of the empyema. These cases were out of the practice of Dr. Emil Beck, the author of the bismuth paste method of treatment.

Two slides were shown of microorganisms (tubercle bacilli) after the injected cavity was treated by bismuth paste for a short time. These were granular and showed evidence of destruction. Many experiments have been made on infected cavities with various microorganisms after these were injected with the paste, and it was found that the material withdrawn gave negative results on culture media.

It is therefore concluded that when the paste comes in contact with an infected surface of a cavity or channel it there causes a leucocytosis, which, in turn, destroys the microorganisms by a chemotactic action. Another very interesting observation that was made in connection with the bismuth paste treatment is the adjunct application of vaccine therapy. It has been found in a few cases that did not do well by the use of the paste that they improved more rapidly when the auto-vaccines were employed in conjunction with the paste.

Theisen.

A Brief History of the Treatment of Stammering, With Some Suggestions as to Modern Methods.

G. HUDSON-MAKUEN, Philadelphia (*Medical Record*, December 18, 1909). With a little external help, one-fourth of the stammerers might overcome the defect. The cure of the remaining three-fourths presents a very different problem.

The stammerer's speech is faulty in every particular. The central mechanism is out of gear, and his mental attitude towards speech is wholly wrong. The problem is a complicated one, involving not only the mechanism of speech, but also some of the highest intellectual and emotional centers of the brain.

Its scientific treatment must have for its purpose the thorough re-education of the individual. It must supplant his abnormal speech with normal, make it easier for him to speak fluently than to speak hesitatingly, and must develop the patient's confidence in himself. It should be a development of correct speech rather than a cure of the stammering.

The stammerer's instrument, of course, must be put in good condition by the removal of all obstructions, and then he must be taught to use this instrument. Exercises, educational and physiologic, must continue long enough to allow the patient to form entirely new habits of speech and must be adapted to the requirements of each case.

Ryder.

Case Illustrating a New Operation for the Closure of the Mastoid Wound by a Muscle Flap.

SAMUEL IGLAUER (*The Lancet-Clinic*, April, 1910). E. G., female, aged two years, first seen February 28, 1910, suffering with earache.

Previous history: The child had always been well, except for a diarrhea last summer. The present trouble had begun three or four days before with pain in the left ear, without discharge, and with slight fever.

Examination: Well developed and well nourished child. The right ear appeared normal. The left ear showed a reddened bulging drum without a perforation. There was no sinking of the meatal wall. The mastoid seemed to be somewhat tender. An incision of the drum was made and was followed by a discharge from the ear.

March 2. Radiograms by Dr. S. Lange showed a diffuse

clouding of the mastoid region on the left, with a normal mastoid on the right.

March 4. The child suffered with earache and sleeplessness at night. There was a rather free discharge of pus. The meatus appeared normal.

Operation, March 7, 1910: Simple mastoid operation. The bone was found to be soft and necrotic and very vascular. Granulations in the antrum. Dura exposed in the middle fossa.

Plastic operation: The original incision was prolonged upward and then forward into the scalp, which was then dissected free from the posterior portion of the underlying temporal muscle. The exposed muscle tissue with its overlying fascia was then freed from the cranium and split parallel to the muscle fibers, thus forming a muscle flap, with its base under the zygomatic arch. This flap was then rotated downward and backward and was implanted into the mastoid wound, where it was held in place by catgut sutures fastened to the periosteum at the posterior margin of the wound. A drainage tube was introduced into the antrum and gauze was packed around the tube. A counter opening was made through the scalp over the defect corresponding to the original site of the muscle flap and a small drainage tube was introduced here. The original incisions were closed with silkworm gut, except in the region about the drainage tube.

After-treatment: The subsequent course was uneventful, except for a slight edema of the left eyelid and for a hematoma, which formed under the scalp and which supplicated to some extent on the third and again on the thirteenth day. The drainage tube was removed from the mastoid on the third day and the discharge from the meatus ceased by the seventh day. The skin incisions closed by primary union. The discharge from the mastoid wound ceased by the eighteenth day, and the child left the hospital on the twentieth day.

BOOK REVIEWS.

The Functional Test for Hearing. (Ueber die funktionelle Prüfung des menschlichen Gehörorgans.)

By PROF. FRIEDRICH BEZOLD. Edited by PROF. DENKER. Published by J. F. Bergmann, Wiesbaden. Unbound, 6 Marks.

Prof. Denker, of Erlangen, pays his respects to the memory of Prof. Bezold, in editing this third volume of his teacher's monographs. Under stress of pain and suffering, the great master of the Munich school strove to complete this series of articles, which should be his last message to his former pupils. The volume contains five monographs. The first, second and sixth reiterates his former views on the transference of sound waves to the internal ear by means of the ossicular chain alone and not by means of bone skull conduction. The third is a study of a case of congenital atresia of the external ear. The last describes his model of the ear, on which he spent so much study. The thanks of the profession is due Prof. Denker for this labor of love, and we hope the book will have a wide circulation amongst Prof. Bezold's former pupils. *Horn.*

Abscess of the Brain. (Der Hirnabszess.)

By OPPENHEIM AND CASSIRER. Alfred Holder, Leipzig, Publisher. Second Edition, 1909.

The second edition of Oppenheim's Brain Abscess is without question the most important monograph on this subject that at present exists. The statistics of the American, English and German schools have been carefully analyzed, and we are able to gain a clearer insight into the etiology of the abscess than ever before. Over 40 per cent of the abscesses are of otitic origin, and the otologists more than any other class of practitioners should have the subject thoroughly in the hand.

The chapter on Symptomology is exceedingly important, and nowhere do we have the subject matter so clearly and concisely stated as in this book. The remarks on the presence of temperature are of the greatest value. Summing the question up, he concludes: * * * "The temperature during the entire observation period may remain normal. * * * Often

it sinks beneath the normal line as low as 35.5° C. * * * In the preliminary stage we may often have a slight degree of fever. If the trouble starts in acutely, we will always find fever. Because we so often miss this beginning stage, many observers have come to the conclusion that the usual course of the brain abscess is without fever." Since the first edition of this book the percentage of pathologic changes found in the fundus have greatly increased, from 35% to 55%, due to our more careful methods of observation. It is impossible to mention every symptom in this review that has come to be regarded as of value, but any otologist who would attempt to make a diagnosis in a complicated case of brain abscess without being familiar with the contents of this important chapter would be guilty of carelessness.

The Chapter on Diagnosis covers many fields that the otologist should be more familiar with. It is not always necessary to call in an internist to tell us what might be the trouble, if we have first thoroughly digested the subject matter of this carefully summarized part of the book.

Oppenheim's own statistics, which give his cases up to 1901, show that in 206 operations for temporal lobe abscesses, 148 were cured, or over 70 per cent. Of the cerebellar abscesses 45 per cent were saved. Certainly a brilliant record for the German school.

Horn.

Direct Laryngoscopy, Bronchoscopy and Esophagoscopy. (Die direkte Laryngoskopie, Bronchoskopie und Oesophagoskopie.)

By W. BRUENINGS, Freiburg. Published by J. F. Bergmann, Wiesbaden. Price, bound, 14 Marks. 122 Illustrations in Text. 400 Pages.

Perhaps no book dealing with a medical subject has been in recent years so eagerly awaited as this of Brünings, the well-known assistant of Prof. Killian in Freiburg. It hardly seems possible in the very few years since Prof. Killian first examined the bronchi by means of a rigid steel tube, that the importance of the subject should so grow, and the technic and instrumentarium should be so enlarged as to demand a textbook of nearly 400 pages. And yet every word of this book is important, there is no padding, no large type and wide margins, but it is all solid reading, and very important reading as well.

Prof. Killian has had students from all parts of the world, but the American students are amongst his most ardent admirers. It will be a great pleasure to know that they can now possess themselves of the latest word on the subject of bronchoscopy, just as Killian believes in it, and just as it is given in Brünings' courses in that famous old German town. Brünings has given the same charm to his book that he gives to his lectures. One does not need to cross the ocean to understand the subject. The thing which characterizes this book is a wealth of detailed information put with such clearness that one feels a sense of security when one is attempting one's first bronchoscopy.

The photographs of the bronchial tree are magnificent. The details by which the bronchi were prepared for the X-ray photograph show a care in the securing of accurate results which have never before been attempted. The other illustrations are very helpful, and show at first glance just how the patient should be placed for the various methods of bronchoscopy and esophagoscopy.

The chapter which interests the American school the most is a comparison of the methods of illumination. Brünings has not only practically but theoretically proved that a source of light constructed according to his principle and situated at the upper end of the tube has overwhelming advantages over the method of Jackson, where the tiny lamp is carried to the distal end of the tube. The disadvantages of the latter method are the liability of the lamp burning out in the middle of the operation, the danger of breaking, the necessity of constant renewal during an operation to prevent a dimming of the light from blood, mucus, etc., and the greater loss of space in the inner diameter of the tube.

Of the advantage of the extension tube, which Brünings himself invented, there can be to-day no doubt. It is probably his most important contribution to the instrumentarium of bronchoscopy. It has been slightly improved in the last year, and in its present state seems to be as near perfect as one could wish. The remainder of the First Part of the book is a description of the instruments used in the various procedures.

The Second Part takes up the greater portion of the book and is divided into seven chapters.

Chapter I, headed "Endoscopic Propadeutic," gives advice

as to the selection of a complete instrumentarium, exact knowledge as to the kind and amount of the electric current to be used and a careful description of the methods of practicing on the lower animals, the phantom and the dead body.

Chapter II deals with the methods of anesthetizing. Some very important experiments were carried out to determine the amount of cocain which could be used with safety. The ordinary danger limit as usually stated is of no value. Much depends on the method of using, whether in spray or cotton; on the idiosyncrasy of the patient; and the time of day in relation to food ingestion. On an empty stomach, the patients stand cocain badly.

Chapter III deals with direct laryngoscopy, a subject which is receiving more and more attention in Europe. Brünings carries out many operations on the vocal cords by this direct method which formerly were only possible with the mirror.

The anatomy and physiology of the trachea and bronchi, as set forth in Chapter IV, make known for the first time a mass of new facts on these two subjects which will command the attention of all classes of medical men. This chapter shows more clearly than any other how very carefully the whole subject has been worked up, and how this whole new field of bronchoscopy is not based on empiricism, but on a solid anatomic and physiologic foundation.

Chapter V is, of course, the kernel of the whole book. It deals with the direct and indirect tracheobronchoscopy, as Brünings calls the procedure. A detailed review is impossible. I repeat, the subject is so clearly stated that it is almost as good as a personal course with this great teacher and puts everyone in a position where he ought to be able to carry out a successful bronchoscopy the first time he tries it.

The last chapter is devoted to esophagoscopy. The subject is considered in great detail, and will prove very helpful, even to an experienced man.

Take it all in all, the book fulfills more than the most ardent admirers of Killian and Brünings expected of it, and will prove a lasting monument to him, to his famous teacher, and to the clinic at Freiburg. The presswork of the book is above criticism, and the illustrations leave nothing to be desired.

Hörn.

